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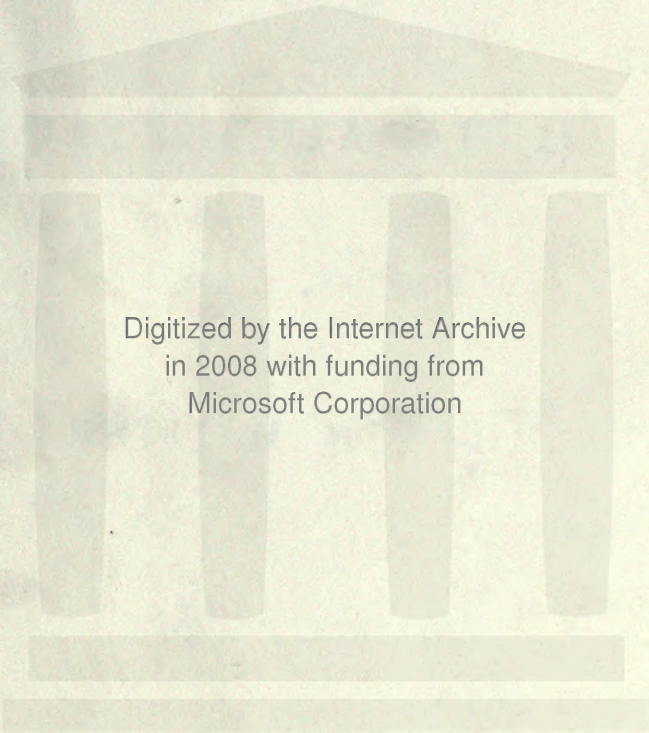
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iphib British Museum (Nat. Hist.). Dept. of Zoology

CATALOGUE

OF THE

BATRACHIA GRADIENTIA

S. CAUDATA

AND

BATRACHIA APODA

IN

THE COLLECTION

OF THE

BRITISH MUSEUM.

SECOND EDITION,

BY

GEORGE ALBERT BOULENGER.

LONDON:
PRINTED BY ORDER OF THE TRUSTEES.
1882.

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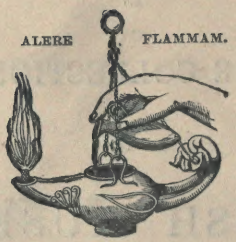

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PREFACE.

The present volume completes the Second Edition of the Catalogue of Batrachians, and if compared with the first edition (prepared by my predecessor nearly thirty years ago) will afford another proof that the collection in the British Museum has held pace with the progress made by science in the intervening period.

Like the first volume of this edition, which was published at the beginning of this year, it has been prepared by Mr. G. A. Boulenger, who, in the meantime, has entered the permanent service of the Trustees.

Our knowledge of the various forms of Tailed and Limbless Batrachians may be considered to be as complete as that of any other order of the Animal Kingdom: possibly Central Asia may yield a certain number of additional species of Newts, and Tropical Africa some hitherto unknown Cœcilias; but we can hardly anticipate that such new discoveries will be fundamentally distinct from the forms with which we are acquainted at present, or lead to modifications of the general results embodied in the summary of the geographical distribution of the entire class of Batrachians which accompanies this volume.

ALBERT GÜNTHER,
Keeper of the Department of Zoology.

British Museum,
November 26, 1882.

INTRODUCTION.

This volume contains descriptions of, or references to, all the species known at present of the Orders *Caudata* and *Apoda*.

The latest general accounts of these animals are contained in J. E. Gray's first edition of this Catalogue, published in 1850, and in vol. ix. of Duméril and Bibron's 'Erpétologie générale' (1854). The numbers of species enumerated in these two works were 63 and 58 respectively, which must be greatly reduced when we omit synonyms. 101 species are described in the present work, four fifths of which are known to the author from autoptical examination *. The number of species in the British-Museum collection amounts to 78, and that of specimens to 1021. The number of species in the collection in 1850 was 38.

The *Apoda* have been quite recently (1879) reinvestigated by Professor Peters; he enumerates 31 species, of which 17 were known to him from direct examination. Duméril and Bibron's (vol. viii. 1842) and Gray's (1850) works contained descriptions of 8 and 9 species respectively. The present work contains diagnoses of 32 species, 19 of which are represented in the national collection, the number of specimens being 116. The collection contained only 5 species in 1850.

* With the exception of five, the species of Tailed Batrachians not examined by the author have been described by American Herpetologists.

A summary of the principal facts of the geographical distribution of Batrachians generally is appended to this volume.

The author begs to express his thanks to the following gentlemen who have kindly placed at his disposal specimens from the collections under their charge:—Professor Vaillant (Muséum d'Histoire naturelle, Paris), M. Dupont (Musée Royale d'Histoire naturelle, Brussels), Dr. Boettger (of the Senckenberg Museum), Professor Schneider (Zoologisches Museum, Breslau). M. Lataste, of Paris, has again given him free access to his important private collection.

As far as possible, the colour is described from life. The measurements are given from the largest specimen in the collection.

As in the preceding volume, the affixes to the names of donors &c. may be explained as follows:—"[P.]" signifies "Presented by"; "[C.]"="Collected by"; "[E.]"="Obtained by exchange."

G. A. BOULENGER.

British Museum,
Nov. 25, 1882.

SYSTEMATIC INDEX.

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CATALOGUE

OF

BATRACHIA CAUDATA AND APODA.

BATRACHIA.

Order II. CAUDATA.

In the perfect state, four (or two) limbs and a tail.

Synopsis of the Families and Subfamilies.

Fam. 1. Salamandridæ (p. 2). No gills in the perfect state; maxillaries present; both jaws toothed; eyelids developed.

Subfam. A. SALAMANDRINÆ (p. 2). Palatine teeth in two longitudinal series, diverging behind, inserted on the inner margin of two palatine processes, which are much prolonged posteriorly; parasphenoid toothless; vertebræ opisthocœlian.

Subfam. B. AMBLYSTOMATINÆ (p. 31). Series of palatine teeth transverse or posteriorly converging, inserted on the hinder margin or posterior portion of the vomers; parasphenoid toothless; vertebræ amphicœlian.

Subfam. C. PLETHODONTINÆ (p. 51). Series of palatine teeth transverse, on posterior portion of vomers; dentigerous plates on parasphenoid; vertebræ amphicœlian.

Subfam. D. DESMOGNATHINÆ (p. 76). Series of palatine teeth transverse, on posterior portion of vomers; dentigerous plates on parasphenoid; vertebræ opisthocœlian.

Fam. 2. **Amphiumidæ** (p. 80). No gills in the perfect state; maxillaries present; both jaws toothed; vertebræ amphicœlian; no eyelids.

Fam. 3. **Proteidæ** (p. 83). External gills persistent throughout life; maxillaries absent; intermaxillaries and mandible toothed; vertebræ amphicœlian; no eyelids.

Fam. 4. **Sirenidæ** (p. 86). External gills persistent throughout life; maxillaries absent; intermaxillaries and mandible toothless; vertebræ amphicœlian; no eyelids.

Fam. 1. SALAMANDRIDÆ.

Salamandridæ, *Gray, Ann. Phil.* 1825.
Salamandrina, *Tschudi, Classif. d. Batr.*
Atrétodères, part., *Dum. & Bibr. Erp. Gén.* ix.
Salamandrida, *Strauch, Rev. d. Salam., in Mém. Ac. St. Pétersb.* (7) xvi. no. 4.

Subfam. A. *SALAMANDRINÆ.*

Salamandridæ, *Gray, Cat. Batr. Grad.*
Salamandridæ, Seiranotidæ, Pleurodelidæ, Tritonidæ, *Hallow. Journ. Ac. Philad.* (2) iii. 1858.
Seiranotidæ, Pleurodelidæ, Salamandridæ, *Gray, Proc. Zool. Soc.* 1858.
Salamandrinæ, *Copè, Proc. Ac. Philad.* 1859.
Salamandridæ, Pleurodelidæ, *Cope, Journ. Ac. Philad.* (2) vi. 1866.
Salamandrida mecodonta, *Strauch, l. c.*

Synopsis of the Genera.

I. Maxillary and pterygoid separate; latter not reaching quadrate.

No fronto-squamosal arch; tongue adherent or slightly free behind; tail rounded; toes five ..... 1. **Salamandra**, p. 3.

No fronto-squamosal arch; tongue, posterior half free; toes five. 2. **Chioglossa**, p. 5.

Fronto-squamosal arch present*, ligamentous or bony; tail compressed; toes five ..... 3. **Molge**, p. 6.

Fronto-squamosal arch bony; toes four.. 4. **Salamandrina**, p. 28.

II. Maxillary reaching quadrate; pterygoid applied to maxillary.

Fronto-squamosal arch bony ..... 5. **Tylototriton**, p. 29.

III. Pterygoid united broadly with maxillary.

Fronto-squamosal arch ligamentous posteriorly; tongue, anterior border free ..... 6. **Pachytriton**, p. 30.

* Except in *Molge cristata.*

1. SALAMANDRA.

Salamandra, *Laur. Syn. Rept.* p. 41; *Tschudi, Batr.* p. 91; *Gray Cat.* p. 16; *Dum. & Bibr.* ix. p. 49; *Strauch, Salam.* p. 28.
Exaeretus, *Waga, Rev. Mag. Zool.* (3) iv. 1876, p. 326.

Tongue rather large, suboval, free on the sides and slightly behind. Palatine teeth in two curved series. No fronto-squamosal arch. Toes five. Tail subcylindrical.
Europo-Asiatic Region, Western Subregion.

Synopsis of the Species.

Tail not quite as long as head and body; black and yellow ..... 1. *maculosa*, p. 3.
Tail not quite as long as head and body; uniform black ..... 2. *atra*, p. 4.
Tail longer than head and body ..... 3. *caucasica*, p. 5.

1. Salamandra maculosa.

Salamandra maculosa, *Gray, Cat.* p. 16.
Lacerta salamandra, *Linn. S. N.* i. p. 371; *Sturm, Deutschl. Faun.*
Salamandra maculosa, *Laur. Syn. Rept.* pp. 42, 151; *Gravenh. Delic.* p. 75; *Bonap. Faun. Ital.*; *Dugès, Ann. Sc. Nat.* (3) xvii. p. 259; *Dum. & Bibr.* p. 52; *De Betta, Mem. Ist. Venet.* xi. p. 515; *Leydig, Arch. f. Nat.* 1867, p. 239; *Strauch, Salam.* p. 30; *Fatio, Vert. Suisse*, iii. p. 491; *De Betta, Faun. Ital., Rett. Anf.* p. 78; *Schreib. Herp. Eur.* p. 75; *Lataste, Herp. Gir.* p. 322.
—— maculata, *Merr. Tent.* p. 185; *Tschudi, Batr.* p. 91.
—— terrestris, *Latr. Hist. Salam.* p. 32, pl. 1; *Daud. Rept.* viii. p. 221, pl. 97. f. 1.
—— corsica, *Savi, Nuov. Giorn. Tosc.* xxxvii. 1838, p. 208; *Bonap. Faun. Ital.*; *Dugès, l. c.* p. 258; *Dum. & Bibr.* p. 61; *De Betta, Mem. Ist. Venet.* xi. p. 520.

Palatine series forming two elongate S-shaped figures, the branches of which do not meet in front, and extend generally a good deal beyond the line of the choanæ; the shape of these series subject to considerable individual variation. Head rather depressed, about as broad as long, the greatest width at angles of jaws; snout rounded; nostril equally distant from the orbit and the tip of the snout; eye large, prominent; no labial lobes. Body stout, rather depressed, thrice and a third to four times the length of the head; no crest. Limbs stout; fingers and toes short, depressed, free; carpal and tarsal tubercles indistinct. Tail generally equal to the distance from its base to the angle of the mouth. Vent a longitudinal slit, the borders of which are never much swollen, but more so in the male than in the female. Skin smooth, shining, porous above; a strong gular fold; distinct parotoids pierced with large pores; a series of large pores along each side of the vertebral line; a lateral series of large warts, and more or less distinct vertical costal grooves; tail with more or less distinct circular grooves. Black, with yellow markings.

	♂.	♀.	
Total length	185	229	millim.
From snout to cloaca	102	127	„
Head	23	25	„
Width of head.....	21	25	„
Fore limb	35	39	„
Hind limb	39	43	„
Tail	83	102	„

Central and South Europe; Algiers; Syria*.

a. ♀.	France.	
b–c. ♂.	Portugal.	P. B. Webb, Esq. [P.].
d–e. Hgr.	Oporto.	E. Allen, Esq. [P.].
f. Yg.	Sierra de Legura, Spain.	Lord Lilford [P.].
g. ♂.	Algiers.	
h. ♂.	Sardinia.	Prof. Bonelli [P.].
i. ♂.	Viterbo.	J. J. Bianconi [P.].
k. ♂.	Hungary.	
l. ♀.	Zebil Bulgar Dagh, Cilician Taurus (4000 feet).	C. G. Danford, Esq. [P.].
m. Many larvæ.	Bred in Cambridge.	F. Bond, Esq. [P.].
n. Many larvæ.	Bred in the Zoological Gardens, London.	
o. Skeleton.	Pyrenees.	
p. Skeleton.	Europe.	

2. Salamandra atra.

Salamandra nigra, *Gray, Cat.* p. 16.

Salamandra atra, *Laur. Syn. Rept.* pp. 42, 149, pl. 1. f. 2; *Daud. Rept.* viii. p. 225; *Merr. Tent.* p. 184; *Gravenh. Delic.* p. 73; *Bonap. Faun. Ital.*; *Dugès, Ann. Sc. Nat.* (3) xvii. p. 260; *Dum. & Bibr.* p. 63; *De Betta, Mem. Ist. Venet.* xi. p. 524; *Leydig, Arch. f. Naturg.* 1867, p. 271; *Fatio, Vert. Suisse*, iii. p. 499; *Schreib. Herp. Eur.* p. 72.

—— fusca, *Laur. l. c.* p. 42.

Lacerta atra, *Sturm, Deutschl. Faun.*

Much like *S. maculosa*; the habit not quite so stout; palatine series less strongly curved; parotoids and lateral glands more prominent. Size smaller. Uniform black.

	♂.	♀.	
Total length	110	113	millim.
From snout to cloaca	59	62	„
Head	12	13	„
Width of head.....	11	13	„
Fore limb	19	21	„
Hind limb	24	23	„
Tail	51	51	„

Alps (2500 to 10,000 feet).

a. ♂.	Tyrol.	Milan Museum [E.].
b. ♀.	Styria.	
c. ♀.	——?	——?

* Dr. Bœttger informs me that he has recently received specimens from the Lebanon.

3. Salamandra caucasica *.

Exaeretus caucasicus, *Waga, Rev. Mag. Zool.* 1876, p. 326.

Palatine series forming two S-shaped figures, the branches of which do not meet in front, and extend a good deal beyond the line of the choanæ. Head depressed, slightly longer than broad, the greatest width at angles of jaws; snout rounded; nostrils equally distant from the orbit and the tip of the snout; eye large, prominent; no labial lobes. Body much elongate, four and a half times the length of the head. Limbs weak; fingers and toes moderate, depressed, free; the adpressed fore limb not quite reaching the adpressed hind limb; carpal and tarsal tubercles indistinct. Tail much longer than head and body. Vent as in *S. maculosa*. Skin smooth, minutely tuberculated on the back; gular fold distinct (?); parotoids distinct, elliptical; no lateral warts; thirteen costal grooves. Black; upper surfaces with round yellow spots arranged rather regularly in two longitudinal series on the back; beneath with a few greyish dots.

	♀.	
Total length	154	millim.
From snout to cloaca	61	,,
Head	11	,,
Width of head	10	,,
Fore limb	20	,,
Hind limb	22	,,
Tail	93	,,

Caucasus.

2. CHIOGLOSSA †.

Chioglossa, *Bocage, Proc. Zool. Soc.* 1864, p. 264, *and Rev. Mag. Zool.* (2) xvi. p. 249; *Strauch, Salam.* p. 52.

Tongue large, oval, supported by a protractile median pedicle, free everywhere except on the anterior half of the median line. Palatine teeth in two curved series. No fronto-squamosal arch. Toes five. Tail cylindrical at the base, compressed at the end.

Spain, Portugal.

1. Chioglossa lusitanica.

Chioglossa lusitanica, *Bocage, ll. cc., Proc.* pl. xxi.; *Bonnaret, Arch. Cosmol.* 1867, p. 99, pl. 9; *Strauch, l. c.*; *Schreib. Herp. Eur.* p. 64.

---

* Described from one specimen sent to the Paris Museum by Dr. Waga.

† Mr. Cope (Proc. Ac. Philad. 1865, p. 196) has identified this genus with *Neurergus*, Cope (ibid. 1862, p. 343); but nothing in the description of the unique species *N. crocatus*, Cope (the habitat of which is not stated), justifies this identification. I rather feel inclined to consider *N. crocatus* closely related to *Molge montana*, with which it agrees in the structure of the skull (said to resemble that of *M. marmorata*), in the shape and attachment of the tongue, the arrangement of the palatine teeth, the proportions of the limbs, and the "very broad tarsus."

Palatine series forming two S-shaped figures, the branches of which meet in front, on a line with the choanæ. Head depressed, longer than broad, its greatest width at posterior corners of eyes; snout short, rounded; eyes rather large, prominent; no labial lobes. Body slender, cylindrical, about four times as long as the head; no dorsal crest. Limbs weak; the anterior limb adpressed does not reach the adpressed hind limb; fingers and toes moderately elongate, depressed, free; no carpal nor tarsal tubercles. Tail cylindrical in its anterior third, becoming gradually compressed; no caudal crest; in the young the length of the tail equals about that of head and body, in the adult it equals once and two thirds or twice that length. Vent a longitudinal slit, the borders of which are not swollen. Skin smooth, shining; a strong gular fold extending on each side of the neck and limiting behind the parotoids; a straight fold from the eye to the latter fold; sides of trunk with ten or eleven more or less distinct vertical grooves; a depressed vertebral line; vertical grooves on the sides of the tail. Dark brown, rather lighter below; two broad reddish-golden bands along the body, separated by the dark vertebral line; these bands blend together on the pelvis and continue on the tail.

Total length	132	millim.
From snout to cloaca	45	„
Head	8½	„
Width of head	6½	„
Fore limb	11	„
Hind limb	12	„
Tail	87	„

Portugal; N.W. Spain.

a–c. ♀ & yg.	Coimbra.	Prof. Barboza du Bocage [P.].
d–e. ♀ & yg.	Coruña.	Sr. Don V. L. Seoane [P.].

3. MOLGE.

Triton (*non Linn.*), *Laur. Syn. Rept.* p. 37; *Tschudi, Batr.* p. 95; *Gray, Cat.* p. 18; *Dum. & Bibr.* ix. p. 121; *Strauch, Salam.* p. 34.
Molge, *Merrem, Tent.* p. 185.
Triturus, *Rafinesque, Ann. of Nature*, 1820 (*fide Baird*).
Diemyctylus, *Rafin. l. c.*
Notophthalmus, *Rafin. l. c.*; *Gray, Cat.* p. 22.
Oiacurus, *Leuckart, Isis*, 1821, p. 260.
Pleurodeles, *Michah. Isis*, 1830, p. 195; *Tschudi, l. c.* p. 91; *Gray, l. c.* p. 17; *Dum. & Bibr.* p. 71; *Strauch, l. c.* p. 31.
Bradybates, *Tschudi, l. c.* p. 91; *Gray, l. c.* p. 26; *Dum. & Bibr.* p. 75; *Strauch, l. c.* p. 32.
Cynops, *Tschudi, l. c.* p. 94; *Gray, l. c.* p. 24.
Megapterna, *Savi, Nuov. Giorn. Tosc.* xxxvii. p. 211.
Euproctus, *Gené, Syn. Rept. Sard.* p. 94; *Gray, Cat.* p. 24; *Dum. & Bibr.* p. 157.
Glossoliga, *Bonap. Faun. Ital.*
Pelonectes, *Fitzing. Syst. Rept.* i. p. 33 (*name only*).
Lissotriton, *Bell, Brit. Rept.* p. 132.

Taricha, *Gray*, *Cat.* p. 25.
Lophinus (*Rafin.*), *Gray*, *l. c.* p. 26.
Ommatotriton, *Gray*, *l. c.* p. 28.
Hemisalamandra, *Dugès*, *Ann. Sc. Nat.* (3) xvii. p. 256.
Hemitriton, *Dugès*, *l. c.*
Calotriton, *Gray*, *Proc. Zool. Soc.* 1858, p. 139.
Pyronicia, *Gray*, *l. c.* p. 140.
Triturus, *Bouleng. Bull. Soc. Zool. France*, 1878, p. 307.
Pelonectes (*non Fitzing.*), *Lataste*, *Rev. Int. Sc.* iii. 1879, p. 275.

Tongue free along the sides, adherent or more or less free behind. Palatine teeth in two straight or slightly curved series. Fronto-squamosal arch present (except in *M. cristata*), ligamentous or bony. Toes five. Tail compressed.

Europo-Asiatic and North-American Regions.

Synopsis of the Species.

I. Males with a dorsal crest.

A. Fronto-squamosal arch absent.

Dorsal crest toothed; belly orange, black-spotted ..... 1. *cristata*, p. 8.

B. Fronto-squamosal arch ligamentous.

Dorsal crest toothed; belly orange, black-spotted ..... 2. *blasii*, p. 10.
Dorsal crest not toothed; belly generally dark, white-dotted ..... 3. *marmorata*, p. 11.
Dorsal crest low, straight-edged; belly orange, immaculate ..... 4. *alpestris*, p. 12.
Dorsal crest festooned; toes of male lobate; belly black-spotted ..... 6. *vulgaris*, p. 14.

C. Fronto-squamosal arch bony.

Dorsal crest high, not confluent with caudal; a black lateral band..... 5. *vittata*, p. 13.
Dorsal crest low; toes of male webbed; throat pigmentless ..... 7. *palmata*, p. 16.

II. Males without dorsal crest.

A. Fronto-squamosal arch ligamentous.

Parotoids very distinct; male with a fibular enlargement ..... 14. *montana*, p. 23.

B. Fronto-squamosal arch bony.

1. Head not much depressed.

Head with three longitudinal grooves; male with a cutaneous fold on each side of the back; belly orange, immaculate ..... 8. *montandonii*, p. 17.

No cutaneous lateral fold; lower surfaces orange, black-spotted ..... 9. *boscæ*, p. 18.
Parotoids generally very prominent; blackish above; carmine beneath, black-spotted ..... 10. *pyrrhogastra*, p. 19.
Loreal region nearly vertical; brown above; bluish black beneath, with yellow (red) spots ..... 11. *sinensis*, p. 20.
Head with three longitudinal grooves; three large pores on each side of the head, behind the eyes ..... 13. *viridescens*, p. 21.

2. Head much depressed.

a. Palatine teeth commencing on a line with the choanæ.

Vent-opening longitudinal; tongue attached behind..... 12. *torosa*, p. 20.
Cloaca conical, with circular opening; male with a fibular spur ..... 15. *rusconii*, p. 24.
Cloaca conical in the female, globular in the male, with circular opening; no fibular spur ..... 16. *aspera*, p. 24.
Vent-opening longitudinal; tongue free behind; palatine teeth forming a ∩; contour of lower law semicircular .. 17. *poireti*, p. 25.
Vent-opening longitudinal; tongue free behind; palatine teeth forming a ∧; contour of lower jaw semielliptical .. 18. *hagenmuelleri*, p. 26.

b. Palatine teeth commencing in front of the line of the choanæ.

Ribs very long, ending in a sharp point, which frequently perforates the skin.. 19. *waltlii*, p. 27.

1. Molge cristata.

Triton cristatus, *Gray, Cat.* p. 19.
Lacerta palustris, part., *Linn. Faun. Suec.* p. 281, *and S. N.* i. p. 370.
Triton cristatus, *Laur. Syn. Rept.* pp. 39, 146; *Tschudi, Batr.* p. 95; *Bonap. Faun. Ital.*; *Bell, Brit. Rept.* p. 119: *Dum. & Bibr.* p. 131; *De l'Isle, Ann. Sc. Nat.* (4) xvii. p. 366; *Leydig, Arch. f. Naturg.* 1867, p. 176; *Strauch, Salam.* p. 42; *Fatio, Vert. Suisse*, iii. p. 520; *Schreib. Herp. Eur.* p. 48.
—— carnifex, *Laur. l. c.* pp. 38, 145, pl. 2. f. 3; *Bonap. l. c.*
Lacerta porosa, *Retz. Faun. Suec.* i. p. 288.
Salamandra cristata, *Houttuyn, Verhand. Genootsch. Vlissing.* ix. p. 333, pl. —. f. 4; *Schneid. Hist. Amph.* p. 57; *Latr. Hist. Salam.* p. 43, pl. 3. f. 3; *Daud. Rept.* viii. p. 233.
—— pruinata, *Schneid. l. c.* p. 69.
—— carnifex, *Schneid. l. c.* p. 71.
Lacerta palustris, *Sturm, Deutschl. Faun.*
Triton palustris, *Flem. Brit. An.* p. 157; *Jenyns, Brit. Vert.* p. 303.
Molge palustris, *Merr. Tent.* p. 187; *Gravenh. Delic.* p. 85.

Triton marmoratus, *Bonap. l. c.*
—— bibronii, *Bell, l. c.* p. 129.
Hemisalamandra cristata, *Dugès, Ann. Sc. Nat.* (3) xvii. p. 262.
Triton cristatus, var. icterica, *Reichenb. Nov. Acta Ac. Leop.-Carol.* xxxii. 1865, pl. 1.

No fronto-squamosal arch; frontals without or with very indistinct orbital processes. Palatine teeth in two nearly straight parallel series, commencing on a line with the choanæ, or a little in front of these; the series generally approximating in front, but very seldom uniting. Tongue small, elliptic, the lateral borders free. Head as long as broad, or a little longer; its length contained about four times in the female, thrice and a fourth to thrice and a half in the male, in the length of the body; the greatest width of head at angles of jaws; snout rounded, very convex; labial lobes much developed during the breeding-season. Body rounded; a very high deeply-toothed dorsal crest in the breeding male, commencing between the eyes, abruptly sinking on pelvic region; a longitudinal groove in the female. Limbs moderate; fingers and toes free, depressed, rather slender in the male, shorter in the female; two small carpal and tarsal tubercles, the inner frequently indistinct. Tail as long as, or a little shorter than, head and body, ending in a point, strongly compressed during the breeding-season, and with an upper and lower crest, the former being very high, and generally denticulated in the male. Skin more or less strongly tuberculate above and beneath; head and parotoid region with distinct pores; a series of pores between axilla and groin; a strong gular fold. Brown, blackish, or olive above, with more or less distinct black spots; sides with white punctulation; the breeding male's head elegantly marbled with black and white; female sometimes with a yellow vertebral line; orange beneath, spotted or marbled with black; fingers and toes yellow, with black annuli; breeding male with a silvery-white band along the side of the tail; female with the lower edge of the tail orange, immaculate.

	♂.	♀.	
Total length	130	145	millim.
From snout to cloaca	65	80	„
Head	14	15	„
Width of head	12	14	„
Fore limb	25	24½	„
Hind limb	27	26	„
Tail	65	65	„

Great Britain, North and Central France, Belgium, Holland, Switzerland, Sweden, Denmark, Germany, Austria, Greece, Turkey, Russia eastwards to Transcaucasia.

a. ♀, with gills.	Suffolk.	Dr. Woodward [P.].
b–c. ♂.	Near London.	Dr. J. E. Gray [P.].
d–e. ♀ & yg.	Bayswater.	R. Latham, Esq. [P.].
f, *g–i*, *k–m*. Larvæ & yg.	Cobham.	Dr. W. E. Leach [P.].

n. ♂.	Wandsworth.	Dr. W. E. Leach [P.].
o. ♀.	Near Oldham.	D. Dyson, Esq. [P.].
p. ♀.	Exeter.	Dr. W. E. Leach [P.].
q–s. ♂, ♀, & yg.	Sweden.	C. J. A. Thuden, Esq. [P.].
t–w. Larvæ.	Hamburg.	
x. ♂.	Russia?	
y. Skeleton.	Scotland.	Dr. Johnson.
z. Skeleton.	—— ?	

Var. karelinii.

Salamandra platycauda, *Rusconi, Amours des Salam.* p. 29, pls. 1, 2.
? Triton nycthemerus, *Michah. Isis*, 1830, p. 806.
Petraponia nigra, *Massalongo, Ann. Sc. Nat. Bologna*, vii. 1853, p. 5.
Triton cristatus, *De Betta, Mem. Ist. Venet.* xi. p. 534, *and Faun. Ital., Rett. Anf.* p. 85.
—— karelinii, *Strauch, Salam.* p. 42, pl. 1. f. 1.
—— cristatus, var. platycephalus, *Fatio, Vert. Suisse*, iii. p. 527.

Palatine series meeting in front, sometimes forming a Λ. Head larger; snout broader, more depressed. Body shorter (generally 15 præsacral vertebræ against 16 or 17 in *M. cristata* typus). Upper surfaces lighter, generally greenish; a yellowish vertebral line constant in the female.

	♂.	♀.	
Total length	112	136	millim.
From snout to cloaca	63	75	„
Head	15	15	„
Width of head	13½	14	„
Fore limb	26	26	„
Hind limb	29	28	„
Tail	59	61	„

It is not possible, as yet, to trace the geographical distribution of this form. It is known from Italy, Dalmatia, and N.E. Persia; and I have recently examined a specimen from Koutais, Caucasus, in the Senckenberg Museum.

a, *β–δ.* ♂ ♀.	Italy.	J. J. Bianconi [P.].
ε–θ. ♂ ♀.	Turin.	Prof. Bonelli [P.].
ι. ♀.	Lombardy.	Milan Museum [E.].
κ. ♂. (Agreeing perfectly with the figure given by Strauch).	—— ?	

As another variety of *M. cristata* must probably be considered:—

Triton longipes, Strauch, l. c. p. 44, pl. 1. f. 2.

Proportions and shape of head as in the preceding variety, but the fingers and toes much elongate.
Astrabad, in the province Mazanderan, Persia.

2. Molge blasii.

Triton blasii, *De l'Isle, Ann. Sc. Nat.* (4) xvii. p. 364; *Schreib. Herp. Eur.* p. 46.
—— marmoratus, var. blasii, *Strauch, Salam.* p. 47.

This form is intermediate between, and perhaps a hybrid of, *M. cristata* and *marmorata*. Some specimens approach the former; others (and such are those in the British Museum) are nearer the latter.

Fronto-squamosal arch ligamentous; frontals with orbital processes. Palatine teeth forming a ∧. Proportions of head and body intermediate between the two last-named species. Dorsal crest high, toothed. Green above, spotted or marbled with brown; sides, and sometimes lower surfaces, with white punctulation; female generally with an orange vertebral line; orange or brownish orange beneath, spotted with black; breeding male with a silvery-white band along the side of the tail.

	♂.	♀.	
Total length	140	156	millim.
From snout to cloaca	70	78	„
Head	15	15	„
Width of head.....	12½	13	„
Fore limb	27	25	„
Hind limb	30	26	„
Tail	70	78	„

N.W. France.

a–b. ♂ ♀. Bretagne. Paris Museum [E.].

3. Molge marmorata.

Triton marmoratus, *Gray, Cat.* p. 20.
? Triton gesneri, *Laur. Syn. Rept.* p. 38; *Schneid. Hist. Amph.* p. 19.
Salamandra marmorata, *Latr. Hist. Salam.* p. 33, pl. 3. f. 2; *Daud. Rept.* viii. p. 241.
Hemisalamandra marmorata, *Dugès, Ann. Sc. Nat.* (3) xvii. p. 261.
Triton marmoratus, *Dum. & Bibr.* p. 135, pl. 106. f. 1; *De l'Isle, Ann. Sc. Nat.* (4) xvii. p. 364; *Strauch, Salam.* p. 46; *Fatio, Vert. Suisse*, iii. p. 532; *Schreib. Herp. Eur.* p. 43; *Lataste, Herp. Gir.* p. 331.
Pyronicia marmorata, *Gray, Proc. Zool. Soc.* 1858, p. 137.

Fronto-squamosal arch ligamentous; frontals with distinct orbital processes. Palatine teeth in two series converging towards front, forming a ∧, commencing on a line with the choanæ. Tongue small, elliptic, free along the sides. Head about as long as broad: its length contained about thrice in the male, about thrice and a half in the female, in the length of the body; the greatest width of head at eyes; snout broad, rounded, depressed; labial lobes well developed during the breeding-season. Body rounded; breeding male with an elevated straight-edged dorsal crest abruptly sinking on pelvic region; a longitudinal groove in the female. Limbs moderate; fingers and toes free, depressed, rather slender in the male, shorter in the female; carpal and tarsal tubercles very indistinct. Tail as long as, or a little longer than, head and body, ending in a point, strongly compressed during the breeding-season, and

with an upper and lower crest. Skin more or less strongly tuberculate above and beneath; head and parotoid region with distinct pores; a series of pores between axilla and groin; a strong gular fold. Green above, marbled with black; dorsal and upper caudal crest with vertical, alternately black and white bars; female with an orange vertebral line; a silvery-white band along the side of the tail, most distinct in the breeding male; fingers and toes green, with black annuli; lower surfaces brown or greyish, with more or less distinct darker spots, punctulated with white. (This punctulation is absent in specimen *i*, the lower surfaces being beautifully black-and-white marbled.)

	♂.	♀.	
Total length	131	133	millim.
From snout to cloaca	62	68	„
Head	15	15	„
Width of head.....	14½	15	„
Fore limb	28	27	„
Hind limb	29	27	„
Tail	69	65	„

France, Spain, Portugal.

a–b. ♂.	Fontainebleau.	G. A. Boulenger, Esq. [P.].
c–d, e. ♀.	Nantes.	
f. Yg.	Montpellier.	
g–h. ♂.	Park in Palace-grounds of Quiluz.	H. O. Forbes, Esq. [P.].
i. ♂.	Oporto.	
k–l. ♀ & yg.	Oporto.	Col. Owen, K.C.A. [P.].
m. ♀.	Oporto.	E. Allen, Esq. [P.].

4. Molge alpestris.

Triton? alpestris, *Gray, Cat.* p. 21.

Triton alpestris, *Laur. Syn. Rept.* pp. 38, 142, pl. 2. f. 4; *Sturm, Deutschl. Faun.*; *Tschudi, Batr.* p. 95; *Bonap. Faun. Ital.*; *Dum. & Bibr.* p. 146; *De Betta, Mem. Ist. Venet.* xi. p. 540; *Fatio, Bibl. Univ.* 1864, p. 275; *Leydig, Arch. f. Naturg.* 1868, p. 198; *Strauch, Salam.* p. 49; *Fatio, Vert. Suisse*, iii. p. 541, pl. 3; *De Betta, Faun. Ital., Rett. Anf.* p. 87; *Schreib. Herp. Eur.* p. 38.

—— wurfbainii, *Laur. l. c.* p. 38.

—— salamandroides, *Laur. l. c.* p. 40.

Salamandra cincta, *Latr. Salam.* p. 52, pl. 5. f. 5; *Daud. Rept.* viii. p. 259.

—— rubriventris, *Daud. l. c.* p. 239, pl. 98. f. 1.

—— alpestris, *Bechst., Lacép.* ii. p. 260; *Schneid. Hist. Amph.* p. 71.

—— ignea, *Bechst. l. c.* p. 263.

Molge ignea, *Merr. Tent.* p. 186; *Gravenh. Delic.* p. 81.

—— alpestris, *Merr. l. c.* p. 187.

Triton apuanus, *Bonap. Faun. Ital.*

Hemitriton alpestris, *Dugès, Ann. Sc. Nat.* (3) xvii. p. 263.

Fronto-squamosal arch ligamentous; frontals with distinct orbital

processes. Palatine teeth in two series convergent towards front, forming a Λ, commencing on a line with the choanæ. Tongue small, subcircular, the sides free. Head a little longer than broad; its length contained about thrice in the male, about thrice and a half in the female, in the length of the body; the greatest width of head at eyes; snout broad, rounded; breeding male with a low straight-edged dorsal crest, which is not interrupted on the pelvic region. Limbs moderate; fingers and toes free, depressed, short, scarcely longer in the male than in the female; two small carpal and tarsal tubercles. Tail as long as, or a little shorter than, head and body, ending in a point, strongly compressed during the breeding-season, and with an upper and lower crest. Skin more or less distinctly tuberculate on upper surfaces, smooth beneath; head and parotoid region with distinct pores; a distinct gular fold. Upper parts brown, blackish, greyish, or purplish, uniform or marbled with darker; a lateral series of small black spots on whitish ground, this being bordered inferiorly in the breeding male by a sky-blue band; dorsal and caudal crests white, with round black spots; fingers and toes with black annuli; belly orange or red, immaculate; throat frequently black-dotted; the lower edge of the female's tail orange, with round black spots.

	♂.	♀.	
Total length	83	104	millim.
From snout to cloaca	43	52	„
Head	10½	11	„
Width of head	9½	10	„
Fore limb	17	17	„
Hind limb	17	17	„
Tail	40	52	„

North and Central France, Belgium, Holland, Germany, Switzerland, Austria, North Italy.

a–b. ♀.	Belgium.	Dr. A. Günther [P.].
c, d–e. ♂ ♀.	Alps.	
f–h. ♂.	Federn See, S. Germany.	Dr. A. Günther [P.].
i–k. ♂, with gills.	Lombardy.	Milan Museum [E.].

5. Molge vittata.

Ommatotriton vittatus, *Gray, Cat.* p. 29.

Triton vittatus (*Gray*), *Jenyns, Brit. Vert.* p. 305; *Guérin, Icon. R. A.* p. 17, pl. 28. f. 2; *Dugès, Ann. Sc. Nat.* (3) xvii. p. 271; *Dum. & Bibr.* p. 144; *Strauch, Salam.* p. 50; *Schreib. Herp. Eur.* p. 35; *Lataste, Bull. Soc. Zool. France*, 1877, p. 359.

Lissotriton palmipes, var., *Bell, Brit. Rept.* p. 140.

—— punctatus, var., *Bell, l. c.* 2nd edit. p. 151.

Triton ophryticus, *Berthold, Götting. Nachr.* 1846, p. 189; *Strauch, l. c.* p. 47, pl. i. f. 3; *Steindachn. Verh. zool.-bot. Ges. Wien*, xxiv. 1874, p. 480.

Ommatotriton vittatus, *Cooke, Our Reptiles*, p. 169, pl. 10.

Fronto-squamosal arch bony. Palatine teeth in two series, in contact in their anterior third, diverging posteriorly, commencing on a line with the choanæ. Tongue small, subcircular, sides and posterior margin free. Head a little longer than broad, its length contained about thrice and a half in the length of the body; the greatest width of head at angles of mouth; snout rounded; labial lobes well developed during the breeding-season. Body rounded; breeding male with an elevated, slightly toothed dorsal crest abruptly sinking on pelvic region; a slight vertebral ridge in the female. Limbs moderate; fingers and toes moderate, latter webbed at the base in the breeding male; tarsal tubercles two, sometimes indistinct. Tail a little longer than head and body, ending in a point, strongly compressed during the breeding-season, and with an upper and lower crest. Skin smooth or minutely tuberculate; head and parotoid region with distinct pores; no gular fold. Grey or brown above, closely black-spotted; dorsal crest with vertical black bars, alternately broader and narrower; side of body and tail with a white, black-edged band; throat black-dotted; belly immaculate.

	♂.	♀.	
Total length	111	104	millim.
From snout to cloaca....	51	51	„
Head	11	11	„
Width of head	9½	10	„
Fore limb	18	17	„
Hind limb	20	16	„
Tail	60	53	„

Asia Minor, Syria.

a–c. ♂ ♀.	——?	Dr. J. E. Gray [P.]. (Types.)
d–f. ♂ & yg.	Asia Minor.	

6. Molge vulgaris.

Lophinus punctatus, *Gray, Cat.* p. 27.
Lacerta vulgaris, *Linn. Faun. Suec.* p. 281, *and S. N.* i. p. 370.
—— palustris, part., *Linn. ll. cc.*
—— aquatica, *Linn. ll. cc.*
Triton palustris, *Laur. Syn. Rept.* pp. 39, 145, pl. 4. f. 2.
—— parisinus, *Laur. l. c.* p. 40; *Tourneville, Bull. Soc. Zool. France,* 1879, p. 74.
Salamandra exigua, *Laur. l. c.* pp. 41, 148, pl. 3. f. 4.
—— tæniata, *Schneid. Hist. Amph.* p. 58.
—— abdominalis, *Latr. Hist. Salam.* p. 50, pl. 5. f. 4; *Daud. Rept.* viii. p. 250.
—— punctata, *Latr. l. c.* p. 53, pl. 6. f. 6; *Daud. l. c.* p. 257.
Lacerta tæniata, *Sturm, Deutschl. Faun.*
Molge punctata, *Merr. Tent.* p. 186.
Triton abdominalis, *Bibr. in Bory, Expéd. Morée,* iii. pl. 15. f. 4, 5.
Molge tæniata, *Gravenh. Delic.* p. 76, pl. 11 & pl 12. f. 1, 2.
Salamandra vulgaris, *Gray, Griff. A. K.,* ix. Syn. p. 106.
Triton vulgaris, *Flem. Brit. Anim.* p. 158.
—— lobatus (*Otth*), *Tschudi, Batr.* p. 95; *Fatio, Vert. Suisse,* iii. p. 557, pl. 4.

Triton punctatus, *Bonap. Faun. Ital.*; *Jenyns, Brit. Vert.* p. 304; *Sélys, Faun. Belg.* p. 182, pl. 5. f. 2; *Dugès, Ann. Sc. Nat.* (3) xvii. p. 269; *Dum. & Bibr.* p. 141.
—— exiguus, *Bonap. l. c.*
Lissotriton punctatus, *Bell, Brit. Rept.* p. 132, and 2nd edit. p. 143.
—— palmipes, *Bell, l. c.* p. 139.
Pyronicia punctata, *Gray, Proc. Zool. Soc.* 1858, p. 137.
Triton tæniatus, *Leydig, Arch. f. Naturg.* 1868, p. 212; *Strauch, Salam.* p. 49; *Schreib. Herp. Eur.* p. 24.

Fronto-squamosal arch ligamentous; frontals with distinct orbital processes. Palatine teeth in two series, parallel, and in contact in their anterior half, diverging behind, thus forming a ⅄-shaped figure; these series commencing on a line with the choanæ. Tongue small, elliptical, free along the sides. Head longer than broad, its length contained about thrice in the length of the body, the greatest width at posterior corners of eyes; three distinct longitudinal grooves on the head; snout rather elongate, rounded or subconical and truncate; labial lobes well developed during the breeding-season, most so in the female. Body rounded; breeding male with an elevated, festooned dorsal crest, commencing on the occiput and not interrupted on the pelvic region; female with a dorsal ridge, or very low, straight-edged crest confluent with the caudal. Limbs moderate; fingers and toes depressed, shorter in the female; during the breeding-season the toes of the male lobate; two small carpal and tarsal tubercles, less distinct in the male. Tail a little longer than head and body, strongly compressed during the breeding-season, ending in a point, with an upper and lower crest; in the male, the latter festooned like the dorsal crest. Skin smooth, or nearly so; head with distinct series of pores; gular fold absent, or very feebly marked. Upper parts brown or olive, with darker spots; these are large and rounded in the male, small and sometimes confluent into a lateral band in the female and young; head with five longitudinal dark streaks, most distinct in the male; lower surfaces yellowish, with a median orange or reddish zone, and large round black spots in the male or small black dots in the female, the latter frequently confluent into a line along each side of the belly; lower edge of the tail uniform orange in the female, red bordered above with blue and interrupted by vertical black spots in the male.

	♂.	♀.	
Total length	83	83	millim.
From snout to cloaca	40	40	„
Head	9½	9	„
Width of head	7	7	„
Fore limb	14½	14	„
Hind limb	16	13	„
Tail	43	43	„

Europe, with exception of S. France, Spain, and Portugal; Temperate Asia.

a, b. ♂ ♀.	Scotland.	Dr. Johnson [P.].
c, d–g, h–n. ♂, ♀, & yg.	Near London.	
o. Several larvæ.	Cobham.	
p–s, t–v. ♂ ♀.	Wandsworth.	Dr. Leach [P.].
w–z. ♂.	Bridgewater.	
α–δ. Yg.	Falmouth.	
ε, ζ–θ. ♂ & yg.	Sweden.	C. J. A. Thuden, Esq. [P.].
ι–κ, λ. Several spec., ♂ ♀.	Hamburg.	
μ. ♂.	Near Sarpsbourg.	— Lowndes, Esq. [P.].
ν–ξ. ♂ ♀.	Lombardy.	Milan Museum [E.].
ο. ♂.	China.	A. Adams, Esq. [C.].
π–σ. Skeletons.	——?	

VAR. **meridionalis.**

Salamandra exigua, *Rusconi, Amours des Salam.* p. 28, pl. 1.
Triton palmatus, *Bonap. Faun. Ital.*
—— lobatus, *Bonap. l. c.*
—— punctatus, *De Betta, Mem. Ist. Venet.* xi. p. 546, pl. 25.
—— tæniatus, *De Betta, Faun. Ital., Rett. Anf.* p. 89.
—— tæniatus, var., *Schreib. Herp. Eur.* p. 25.
—— paradoxus (*non Razoum.*), *Bedriaga, Bull. Mosc.* 1881, p. 287.

Smaller; the body of the male subquadrangular; dorsal crest lower; tail generally ending in a filament; spots smaller. Its physiognomy is similar to that of *M. palmata*.

North Italy and neighbouring parts of Austria; Greece.

τ–φ. ♂ ♀.	Turin.	Prof. Bonelli [P.].
χ–αα. ♂.	Görz.	G. A. Boulenger, Esq. [P.].

7. Molge palmata.

Lophinus palmatus, *Gray, Cat.* p. 28.
Lacerta paradoxa seu helvetica, *Razoum. Hist. Nat. Jorat.* i. p. 3, pl. 2. f. 5.
Salamandra palmata, *Schneid. Hist. Amph.* p. 72.
—— palmipes, *Latr. Hist. Salam.* p. 55, pl. 6. f. 7; *Daud. Rept.* viii. p. 253, pl. 98. f. 2.
Molge palmata, *Merr. Tent.* p. 186.
Triton palmatus, *Tschudi, Batr.* p. 95; *Sélys, Faun. Belg.* p. 182, pl. 5. f. 1; *Dugès, Ann. Sc. Nat.* (3) xvii. p. 270; *Dum. & Bibr.* p. 148; *Fatio, Vert. Suisse*, iii. p. 570, pl. 4; *Lataste, Herp. Gir.* p. 339.
Lissotriton palmipes, *Bell, Brit. Rept.* 2nd edit. p. 154.
Triton helveticus, *Leydig, Arch. f. Naturg.* 1868, p. 220; *Strauch, Salam.* p. 50; *Schreib. Herp. Eur.* p. 31; *Brüggemann, Arch. f. Naturg.* 1876, p. 19; *Tourneville, Bull. Soc. Zool. France*, 1879, p. 74.

Fronto-squamosal arch bony. Vomerine teeth in two posteriorly diverging series, forming a Λ- or ⅄-shaped figure; these series commencing on a line with the choanæ. Tongue as in *M. vulgaris*. Head as in the latter species, but the snout broader; length of head contained about twice and two thirds in the male, thrice in the

female, in the length of the body. Body quadrangular in the breeding male, a more or less developed cutaneous fold bordering each side; a low, entire, vertebral crest; in the female, the body is nearly round, with a low vertebral ridge, as in *M. vulgaris*. Limbs moderate; fingers and toes depressed, the latter fully webbed in the breeding male; two small carpal and tarsal tubercles. Tail a little longer than head and body, strongly compressed during the breeding-season, and with an upper and lower crest; the male's tail truncate and ending in a filament; this filament scarcely distinct in the female. Skin smooth, or nearly so; head with distinct series of pores; gular fold generally distinct. Upper parts brown or olive, with small darker spots; head with longitudinal dark streaks, the outer (those passing through the eyes) being constant; in the male, the head is minutely speckled with dark brown, and the dorsal and upper caudal crest and feet are blackish; lower surfaces not coloured, except the median zone of the belly, which is orange; a few small blackish dots are generally scattered on the belly; inferior caudal crest immaculate, orange in the female, bluish grey in the male; a series of spots, sometimes confluent, along the upper and lower border of the tail.

	♂.	♀.
Total length	72	76 millim.
From snout to cloaca	32	37 „
Head	9	9 „
Width of head	7½	8 „
Fore limb	15	13½ „
Hind limb	15	13 „
Tail	40	39 „

Great Britain, France, Belgium, Holland, Switzerland, West Germany, North Spain.

a. ♀.	Scotland.	Dr. Johnson [P.].
b–c. ♂ ♀.	Nottingham.	W. Higginbottom, Esq. [P.].
d. Several spec., ♂ ♀.	Near Hereford.	W. H. Holdsworth, Esq. [P.].
e. Several spec., ♂ ♀.	Bridgewater.	Mr. Baker [P.].
f–i. ♂.	Bridgewater.	
k. ♂.	Falmouth.	— Cocks, Esq. [P.].
l–o. ♂ ♀.	Near Brussels.	G. A. Boulenger, Esq. [P.].

8. Molge montandonii.

Triton montandoni, *Bouleng. Bull. Soc. Zool. France*, 1880, pp. 37, 157, pl. 7.

Fronto-squamosal arch bony. Palatine teeth in two posteriorly diverging series, forming a ⅄-shaped figure; these series commencing on a line with the choanæ. Tongue moderate, oval, free along the sides. Head a little longer than broad, with three distinct longitudinal grooves, its length contained about thrice in the length of the body, the greatest width at posterior corners of eyes; snout rounded; labial lobes well developed during the breeding-season.

Body quadrangular in the male, a well-developed cutaneous f bordering each side; no dorsal crest; in the female, the body nea round. Limbs moderate; fingers and toes depressed, free; car and tarsal tubercles distinct. Tail strongly compressed during breeding-season, and with an upper and lower crest, as long as o little shorter than head and body; in the male it ends in a f ment. Skin smooth or rather warty above, smooth beneath; h with distinct series of pores; a distinct gular fold. Olive or brown above, variegated with darker; the vertebral line generally ligh in the female; in the male, the head is minutely speckled w blackish, and the feet are black; lower surfaces orange, immacula lower caudal edge orange, with black vertical spots in the male.

	♂.	♀.	
Total length	76	85	millim.
From snout to cloaca	38	43	„
Head	9	10	„
Width of head	8	8	„
Fore limb	15	17	„
Hind limb	15	16	„
Tail	38	42	„

Moldavia.

a–c, d–f. ♂ ♀. Moldavia. G. A. Boulenger, Esq. [

9. Molge boscæ.

Pelonectes boscai, *Lataste, Rev. Intern. Sc.* iii. 1879, p. 275; *Tou ville, Bull. Soc. Zool. France*, 1879, p. 72, pl. 7.
Triton palmatus, var. boscai, *Boettger, Zeitschr. ges. Naturw.* (3 p. 516.
—— maltzani, *Boettger, l. c.* p. 521*.

Fronto-squamosal arch bony, thick. Palatine teeth in two po riorly diverging series, forming a ⅄-shaped figure; these se commencing on a line with the choanæ. Tongue moderate, s circular, free along the sides and more or less behind. Hea little longer than broad, with a single longitudinal groove, length contained about thrice in the length of the body; greatest width at anterior corners of eyes; latter prominent; sn broad, truncate; labial lobes much developed. Body subquadr gular in the breeding male, nearly round in the female; no do crest. Limbs moderate; fingers and toes depressed, free; ca and tarsal tubercles distinct. Tail strongly compressed during breeding-season, with an upper and lower crest, as long as o little longer than head and body; in the male the tail ends ra abruptly, and is shortly mucronate. Cloaca of male a longitud

* Having, through the kindness of my friend Dr. O. Boettger, examined type specimen (a young ♂) in the Senckenberg Museum, I am able to that that species is the same as *M. boscæ*. The larger tongue is a charact immaturity, which I have frequently noticed in other species of this genus.

cleft, with strongly swollen lips, as in *M. vulgaris*, that of the female subconical, directed backwards, with circular opening. Skin smooth or slightly granulate above; head with distinct series of pores; parotoid region thickened; a distinct gular fold. Brown or olive above, with irregular darker spots; no longitudinal dark streaks on the head; lower surfaces orange, with scattered round black spots; lower edge of tail yellow, with black spots in the male, immaculate in the female.

	♂.	♀.	
Total length	68	97	millim.
From snout to cloaca	31	39	„
Head	9	10	„
Width of head	7½	8	„
Fore limb	13½	13	„
Hind limb	14	13	„
Tail	37	48	„

Spain, Portugal.

a. Several spec., ♂ ♀.	Coruña.	G. A. Boulenger, Esq. [P.].
b–d. ♂, ♀, & yg.	Oporto.	E. Allen, Esq. [P.].

10. Molge pyrrhogastra.

Cynops pyrrhogaster, *Gray, Cat.* p. 25.
Molge pyrrhogastra, *Boie, Isis*, 1826, p. 215.
Salamandra subcristata, *Schleg. Faun. Japon., Amph.* p. 125, pl. iv. f. 1–3, and pl. v. f. 7, 8, *and Abbild.* p. 122, pl. 40. f. 1–3.
Cynops subcristatus, *Tschudi, Batr.* p. 94.
Triton subcristatus, *Dum. & Bibr.* p. 140.
—— pyrrhogaster, *Strauch, Salam.* p. 51; *Bouleng. Bull. Soc. Zool. France*, 1880, p. 39.

Fronto-squamosal arch bony, thick. Palatine teeth forming a Λ or a ⅄, commencing on a line with the choanæ. Tongue small, subelliptical, the sides slightly free. Head a little longer than broad, without grooves, its length contained thrice to thrice and a half in the length of the body; snout subtruncate; cheeks widening suddenly; eyes prominent; labial lobes much developed. Body subquadrangular in the male, nearly round in the female; no dorsal crest; a prominent vertebral ridge in both sexes, produced by the great development of the spinous processes of the dorsal vertebræ. Limbs moderate; fingers and toes depressed, free; carpal and tarsal tubercles generally distinct. Tail strongly compressed during the breeding-season, sword-shaped, and frequently shortly mucronate in the male, with an upper and lower crest; its length exceeding generally that of head and body. Cloaca as in *M. vulgaris*. Skin generally strongly tuberculate above and beneath, sometimes smooth; parotoids distinct, more or less developed, generally much so; a similar, small, circular gland is generally visible on each side of the throat; a distinct gular fold. Dark olive or blackish above; lower surfaces carmine, spotted with black; lower edge of tail uniform carmine, this bright colour vanishing in the breeding male.

	♂.	♀.	
Total length	93	111	millim.
From snout to cloaca	46	53	„
Head	11	12	„
Width of head	9½	10½	„
Fore limb	18	19	„
Hind limb	20	20	„
Tail	47	58	„

Japan, China.

a–b. ♂.	Northern parts of Niphon.	
c–e. ♂.	Nagasaki.	Prof. St. George Mivart [
f–h. ♂ ♀.	Nagasaki.	Mr. Whitely [C.].
i–l. ♂ ♀.	Japan.	Leyden Museum.
m. ♂.	Kiukiang Mountains, China.	Mr. C. Maries [C.].

11. Molge sinensis.

Cynops chinensis, *Gray, Proc. Zool. Soc.* 1859, p. 229, pl. 19. f
Günth. Rept. Brit. Ind. p. 439.
Triton chinensis, *Strauch, Salam.* p. 51.

Closely allied to the preceding species; differs in the follow characters:—Head widening more gradually; canthus rostr strongly marked; loreal region nearly vertical; snout of male v long. Sides of body with very prominent conical tubercles; pa toids very small; gular fold very strong. Tail table-knife-sha in both sexes. Upper parts uniform brown; lower parts bl black, with small irregular yellow (red?) spots; lower edge of uniform yellow in the female, with yellow spots in the male; la with a broad bluish band along the posterior two thirds of the t

	♂.	♀.	
Total length	131	142	millim.
From snout to cloaca	60	66	„
Head	16	16	„
Width of head	13	15	„
Fore limb	23	22	„
Hind limb	22	24	„
Tail	71	76	„

China.

a–b. ♂ ♀.	N.E. coast of China, inland of Ningpo.	Mr. Fortune (Types.)

12. Molge torosa.

Taricha torosa, *Gray, Cat.* p. 25.
Triton torosus, *Eschsch. Zool. Atlas*, p. 12, pl. 21. f. 15; *Str Salam.* p. 50.
Salamandra beecheyi, *Gray in Griff. A. K.* i. p. 107, *and Beechey's Voy.* pl. 31. f. 3.

Triton ermani, *Wiegm. in Erman's Reise um die Erde*, p. 24.
Salamandra (Triton) granulosa, *Skilton, Amer. Journ.* (2) vii. p. 202.
Notopthalmus torosus, *Baird, Journ. Ac. Philad.* (2) i. p. 284.
Taricha lævis, *Baird & Gir. Proc. Ac. Philad.* 1853, p. 302.
—— torosa, *Girard, U.S. Expl. Exped., Herp.* p. 5, pl. 1. f. 1–8.
Triton lævis, *Strauch, l. c.*
Diemyctylus torosus, *Cope, Bull. U.S. Nat. Mus.* i. p. 28.

Fronto-squamosal arch bony, thick. Palatine teeth in two posteriorly diverging series, forming a Λ-shaped figure; these series commencing on a line with the choanæ. Tongue moderate, suboval, the sides free. Head depressed, about as long as broad, its length contained about thrice in the length of the body; the greatest width at angles of jaws; snout rounded; labial lobes well developed during the breeding-season. Body rounded, crestless. Limbs moderate in the female, very strong in the male; fingers and toes short, much depressed, free; carpal and tarsal tubercles indistinct. Tail strongly compressed, with very low upper and lower crest, its end obtusely pointed, considerably longer than head and body. Cloaca as in *M. vulgaris*. Skin generally granular above and beneath, sometimes smooth (spec. *h*); head with series of pores; parotoids more or less distinct; a strong gular fold. Uniform brown above; beneath and lower edge of tail uniform yellow.

	♂.	♀.	
Total length	156	159	millim.
From snout to cloaca	67	69	„
Head	16	17	„
Width of head	15	16	„
Fore limb	30	24	„
Hind limb	30	25	„
Tail	89	90	„

Western North America.

a–b. ♂.	California.	
c, d. ♂ & skeleton.	Nassa valley.	Mr. Gruber [C.].
e. Hgr.	Chilukiveyuk River.	N. A. Boundary Commission.
f–g. ♂ ♀.	Fraser's River.	H.M.S. 'Plumper' [C.].
h. ♂.	Vancouver Island.	Lieut.-Col. Hawkins [C.].
i, k. ♂ ♀.	——?	Prof. St. George Mivart [P.].
l. Hgr.	——?	

13. Molge viridescens.

Notophthalmus miniatus, *Gray, Cat.* p. 22.
Notophthalmus viridescens, *Gray, l. c.* p. 23.
Triturus (Diemyctylus) viridescens, *Rafin. Annals of Nature*, 1820, no. 22 [not seen by the writer]
—— (Notophthalmus) miniatus, *Rafin. l. c.* no. 24.
Salamandra stellio, *Say, Amer. Joarn.* i. p. 264.
—— dorsalis, *Harlan, Journ. Ac. Philad.* v. p. 101; *Wied, Nova Acta Leop.-Carol.* xxxii. p. 131.
—— symmetrica, *Harlan, l. c.* p. 157; *Holbr. N. Amer. Herp.* v.

p. 57, pl. xvii.; *Dekay, N. Y. Faun., Rept.* p. 73, pl. xv. f. 33
Wied, l. c. p. 125.
Salamandra millepunctata, *Storer, Bost. Journ. N. H.* ii. p. 60.
—— greenii, *Gray, Griff. A. K.* ix. *Syn.* p. 107.
Triton dorsalis, *Holbr. l. c.* p. 77, pl. xxv.; *Dum. & Bibr.* p. 155.
—— millepunctatus, *Dekay, l. c.* p. 84, pl. xv. f. 34.
Notopthalmus miniatus, *Baird, Journ. Ac. Philad.* (2) i. p. 284.
—— viridescens, *Baird, l. c.*
Triton punctatissimus, *Dum. & Bibr.* p. 154.
—— symmetricus, *Dum. & Bibr.* p. 154, pl. 107. f. 2.
Diemyctylus viridescens, *Hallow. Journ. Ac. Philad.* (n. s.) iii. p. 36
—— miniatus, *Hallow. l. c.*
Triton viridescens, *Strauch, Salam.* p. 50.

Fronto-squamosal arch bony. Palatine teeth in two serie parallel and in contact in their anterior half, diverging behin forming a ⅄-shaped figure; these series commencing on a line wit the choanæ. Tongue small, elliptical, free along the sides. Hea longer than broad, its length contained thrice or thrice and a ha in the length of the body; the greatest width at angles of jaws three distinct longitudinal grooves on the head; snout truncate loreal region high, vertical; labial lobes well developed during th breeding-season. Body rounded, no dorsal crest, but the vertebr line swollen. Limbs moderate, the hind pair very strong an dilated, and furnished with black rugosities on the inner surface i the breeding male; fingers and toes depressed, free; inner an outer toes extremely short; carpal and tarsal tubercles indistinc Tail longer than head and body in the adult, strongly compresse during the breeding-season, with an upper and lower crest; it end in a more or less acute point. Cloaca of female as in *M. vulgaris* of breeding male globiform, with inferior central opening, surrounde by radiating cilia. Skin smooth or minutely tubercular; head wit distinct series of pores; three very large pores on each side of th head, behind the eyes; no gular fold. Reddish or olive-brow above, generally dotted with black; on each side of the back a serie of four to seven red, black-edged ocelli; a blackish streak on eac side of the head, passing through the eye, extending sometime along each flank; female frequently with a red dorsal streak; lowe surface red or orange, dotted with black.

(e)

	♂.	♀.	
Total length	92	92	millim.
From snout to cloaca	40	44	„
Head	10	10½	„
Width of head	8	8	„
Fore limb	15	15	„
Hind limb	17	15	„
Tail	52	48	„

United States—Eastern and Austro-riparian districts.

a–b, c, d–e. ♂, ♀, & yg. New York.
f. ♀. Pennsylvania.

g. ♂.	S. Carolina.	Dr. Harlan [P.].
h–i. ♂ ♀.	S. Carolina.	
k–n. ♀ & yg.	N. America.	Edw. Doubleday, Esq. [P.].
o–p. ♀ and breeding ♂ with gills.	N. America.	Prof. St. George Mivart [P.].

14. Molge montana.

Molge platycephala, part., *Gravenh. Delic.* p. 84.
Megapterna montana, *Savi, Nuov. Giorn. Tosc.* xxxvii. p. 211; *Bonap. Faun. Ital.*; *Bedriaga, Zool. Anz.* 1882, p. 45, *and Arch. f. Nat.* xlix. p. 127, pls. 3–5.
Euproctus platycephalus, part., *Bonap. l. c.*; *De Betta, Atti Ist. Venet.* (5) v.
—— montanus, *Giglioli, An. Mus. Genov.* xiii. p. 599; *Bedriaga, Zool. Anz.* 1879, p. 451; *Camerano, Zool. Anz.* 1881, p. 183.
—— platycephalus ?, *Bouleng. Bull. Soc. Zool. France*, 1878, p. 305.

Fronto-squamosal arch ligamentous; frontals with distinct orbital processes. Palatine teeth in two series, parallel, and in contact in their anterior half, divergent behind, thus forming a ⅄-shaped figure; these series commencing on a line with the choanæ. Tongue rather large, subcircular, attached along the median line, slightly free behind, protractile. Head rather large, depressed, longer than broad, its length contained thrice (♂) or thrice and a half (♀) in the length of the body; the greatest width of head at posterior corners of eyes; snout rounded; no labial lobes. Body rounded; no dorsal crest. Limbs moderate; fingers and toes short, depressed; tarsal and carpal tubercles indistinct; male with a much developed, rounded dilatation of the fibulum. Tail a little shorter than head and body, compressed, ending in a point. Vent generally conical, directed backwards, with circular opening; sometimes (♀) a longitudinal slit, the borders of which are scarcely swollen. Skin finely tubercular above, smooth beneath; sides of head with distinct pores; on each side of the neck a large well-defined parotoid gland; no gular fold. Brown, immaculate, or variegated with darker and lighter above and speckled with whitish beneath; sometimes a light vertebral line.

	♂.	♀.	
Total length	114	108	millim.
From snout to cloaca	56	58	„
Head	14	13	„
Width of head	11	10	„
Fore limb	18	18	„
Hind limb	21	20	„
Tail	58	50	„

Corsica.

a–e. ♂ ♀, hgr., & larvæ.	Lago d'Argento, Monte Cinto (6000 feet).	Prof. Giglioli [E.].
f–g. Yg. & larva.	Corsica.	Dr. J. v. Bedriaga [E.].
h–i. Yg. & larva.	Corsica.	G. A. Boulenger, Esq. [P.].

15. Molge rusconii.

Euproctus platycephalus, *Gray, Cat.* p. 24.
Molge platycephala, part., *Gravenh. Delic.* p. 84.
Euproctus rusconii, *Gené, Syn. Rept. Sard.* p. 28, pl. i. f. 3–5; *Bo Faun. Ital.*; *Wiedersheim, An. Mus. Genov.* vii. p. 545, pl. Giglioli, *eod. loc.* xiii. p. 599; *Bedriaga, Zool. Anz.* 1879, p. 4 *Camerano, eod. loc.* 1881, p. 183.
—— platycephalus, part., *Bonap. l. c.*
Triton platycephalus, part., *Strauch, Salam.* p. 50; *Schreib. H Eur.* p. 54.

Fronto-squamosal arch bony. Palatine teeth in two strai series, diverging behind, forming a ⅄- or Λ-shaped figure; t series commencing on a line with the choanæ. Tongue small, s elliptical, the sides free. Head much depressed, much longer t broad, its length contained about thrice in the length of the bo the greatest width at angles of jaws; snout semielliptical; la lobes well developed. Body rounded, crestless. Limbs moder fingers and toes rather elongate, slender, free; in the male fibulum sends forth a pointed, spur-like process, resembling a r mentary toe; no distinct carpal or tarsal tubercles. Tail abou long as head and body, keeled above and beneath, with a s upper and lower crest, ending in an obtuse point. Cloaca, in b sexes, conical, the opening circular and turned backwards; that of male more swollen at the base. Skin smooth or with small tuber above; no gular fold. Brown above, variegated with darker; lo surfaces yellowish, spotted with blackish.

	♂.	♀*.	
Total length	132	76	millim.
From snout to cloaca	64	40	„
Head	15	10	„
Width of head	12	8	„
Fore limb	19	12	„
Hind limb	21	12	„
Tail	68	36	„

Sardinia.

a–d. ♂ & hgr. Mt. Gennargentu. Prof. Giglioli [

16. Molge aspera.

Hemitriton asper, *Dugès, Ann. Sc. Nat.* (3) xvii. p. 266.
—— cinereus (*Dum.*), *Dugès, l. c.* p. 263.
—— rugosus (*Dum.*), *Dugès, l. c.* p. 264.
—— punctulatus (*Dum.*), *Dugès, l. c.* p. 265, pl. 1. f. 1–3.
—— bibronii (*Dum.*), *Dugès, l. c.* p. 256.
Triton pyrenæus, *Dum. & Bibr.* p. 139.
—— rugosus, *Dum. & Bibr.* p. 150.
—— cinereus, *Dum. & Bibr.* p. 151.
—— repandus, *Dum. & Bibr.* p. 151, pl. 106. f. 2.
—— punctulatus, *Dum. & Bibr.* p. 152, pl. 106. f. 3.
—— bibroni, *Dum. & Bibr.* p. 153.

* The dimensions of the female are given from a specimen in the Bre Museum.

Euproctus rusconii, part., *Dum. & Bibr.* p. 158.
Calotriton punctulatus, *Gray, Proc. Zool. Soc.* 1858, p. 139.
Triton platycephalus, part., *Strauch, Salam.* p. 50; *Schreib. Herp. Eur.* p. 54.
Euproctus pyrenæus, *Lataste, Rev. Intern. Sc.* ii. 1878, p. 495.

Fronto-squamosal arch bony. Palatine teeth in two series in contact anteriorly, diverging behind, thus forming a ⅄-shaped figure; these series commencing on a line with the choanæ. Tongue small, elliptical, the sides slightly free. Head depressed, longer than broad, its length contained thrice to thrice and a half in the length of the body, the greatest width at posterior corners of eyes; snout rounded or truncate; labial lobes well developed during the breeding-season. Body rounded; no crest. Limbs moderate; fingers and toes depressed, free; sometimes the tips furnished with a black, corneous, nail-like sheath; no distinct carpal or tarsal tubercles. Tail as long as head and body in the female, shorter and thicker in the male; the tail keeled above, but destitute of regular crest, ending in an obtuse point. Anal opening circular; cloaca of male subglobular; of female much produced, conical, directed backwards. Skin more or less strongly tuberculate above, smooth beneath; a more or less indistinct gular fold. Olive or blackish above, uniform or with yellowish spots, which may be confluent into a broad vertebral line; lower surfaces and lower edge of tail orange, with blackish spots, the median zone of the belly generally immaculate.

	♂.	♀.	
Total length	100	104	millim.
From snout to cloaca	54	52	„
Head	13	12	„
Width of head	11	10½	„
Fore limb	16	16	„
Hind limb	17	16	„
Tail	46	52	„

Pyrenees; mountains of the Pyrenean peninsula.

a–c. ♂ ♀. Pyrenees.
d. ♀. Lower Pyrenees.

17. Molge poireti.

Triton poireti, *Gray, Cat.* p. 18 (not specimens*).
? Triton palustris, *Poiret, Voy. Barbar.* i. p. 290.
Triton poireti, *Gervais, Bull. Soc. Sc. Nat.* 1835, p. 313, *and Ann. Sc. Nat.* vii. p. 312; *Strauch, Salam.* p. 51.
? Euproctus rusconii, *Guichenot, Expl. Sc. Alg., Rept.* p. 29, pl. 4. f. 2.
Triton nebulosus, *Guichen. l. c.* p. 30, pl. 4. f. 1.
Glossoliga poireti, *Gervais, Ann. Sc. Nat.* (3) xx. p. 313, pl. xv. f. 9.
Euproctus poireti, *Dum. & Bibr.* p. 160, pl. 107.

Fronto-squamosal arch bony, thick. Palatine teeth in two slightly curved series, approximating in front, forming a ∩. Tongue rather large, subcircular, extensively free behind and on the sides. Head

* *a*=*M. waltlii*; *b*=*M. cristata.*

much depressed, as long as broad, its length contained about thrice and a half in the length of the body, the greatest width at angles of jaws; snout broad, rounded, the contour of the jaws semicircular; eyes small; labial lobes scarcely distinct. Body rounded, somewhat depressed; no dorsal crest, vertebral line grooved. Limbs moderate; fingers and toes much depressed, free; no carpal or tarsal tubercles. Tail compressed, keeled above and beneath, longer than head and body. Skin strongly tuberculate; parotoid region thickened; a series of large pores from axilla to groin; a strong gular fold. Vent a longitudinal slit, the borders scarcely swollen. Olive-brown above, yellowish or reddish brown beneath, with or without darker markings.

	♀.	
Total length	146	millim.
From snout to cloaca	70	„
Head	15	„
Width of head	15	„
Fore limb	19	„
Hind limb	22	„
Tail	76	„

Algiers.

a, *b*. ♀ & hgr.	Algiers.	
c. Several larvæ.	Algiers.	M. F. Lataste [P.].
d. Skeleton.	Algiers.	

18. **Molge hagenmuelleri.**

Glossoliga poireti, *Bonap. Faun. Ital.*
—— hagenmulleri, *Lataste, Le Naturaliste*, 1881, p. 371.

Differs from the preceding in the following characters:—Palatine teeth forming a Λ. Tongue small, less free behind. Head longer than broad; snout narrower, contour of jaws semielliptic. Limbs, and especially fingers and toes, more slender. Gular fold less accentuated. Size smaller. Olive-brown above, greyish beneath, with more or less distinct darker spots. Breeding male with rugose plates on the inner side of the fore limbs*.

	♂.	♀.	
Total length	99	98	millim.
From snout to cloaca	42	44	„
Head	9½	10	„
Width of head	8	9	„
Fore limb	15	13	„
Hind limb	15	15	„
Tail	57	54	„

Algiers.

a–b. ♂ ♀.	Bona.	M. F. Lataste [P.].
c. ♂.	Bona.	Dr. J. v. Bedriaga [E.].

* These, I am informed by M. Lataste, occur likewise in *M. poireti*.

19. Molge waltlii.

Pleurodeles waltlii, *Gray, Cat.* p. 17.
Bradybates ventricosus, *Gray, l. c.* p. 26.
Pleurodeles waltlii, *Michah. Isis*, 1830, p. 195; *Tschudi, Batr.* p. 91, pl. 2. f. 1; *Bonap. Faun. Ital.*; *Dum. & Bibr.* p. 72, pl. 103. f. 1; *Strauch, Salam.* p. 32; *Schreib. Herp. Eur.* p. 60; *Leydig, Arch. f. Naturg.* xlv. p. 211, pls. 14, 15; *Bedriaga, Bull. Mosc.* 1879, p. 179, *and Zool. Anz.* 1879, p. 94; *Wiedersheim, Zool. Anz.* 1879, p. 622; *Lataste, Actes Soc. Linn. Bord.* (4) iii. p. 113; *Wiedersh. Jen. Zeitschr. Nat.* xiv. p. 371; *Fraisse, Inaug.-Dissert. Würzb.* 1880.
Salamandra major, *Gray, Griff. A. K.* ix. *Syn.* p. 106.
Bradybates ventricosus, *Tschudi, l. c.* p. 91, pl. 2. f. 1; *Bonap. l. c.*; *Dum. & Bibr.* p. 75; *Strauch, l. c.* p. 33; *Schreib. l. c.* p. 68.
Salamandra pleurodeles, *Schleg. Abbild.* p. 122, pl. 39. f. 2–3.

Fronto-squamosal arch bony. Palatine teeth in two slightly curved series approximating in front, diverging behind; these series commencing in front of the line of the choanæ. Tongue rather small, subcircular, the lateral and posterior borders free. Head much depressed, as long as broad, its length contained three to four times in the length of the body, the greatest width at temporal regions; snout short, rounded; labial lobes well developed. Body rounded; no dorsal crest. Limbs moderate, of males stronger and furnished on their inner side, during the breeding-season, with rugose plates; fingers and toes much depressed, free; two small, more or less distinct, carpal and tarsal tubercles. Tail strongly compressed, keeled above and beneath, longer than head and body. Ribs very long, ending in a sharp point, which frequently perforates the skin. Latter strongly tuberculate; a strong gular fold. Vent a longitudinal slit, the borders scarcely swollen. Olive-brown above, yellowish beneath, with blackish markings; lower edge of tail yellowish or orange.

	♂.	♀.	
Total length	224	182	millim.
From snout to cloaca	93	87	„
Head	19	20	„
Width of head.....	20	20	„
Fore limb	33	26	„
Hind limb	37	30	„
Tail.....	131	95	„

Spain and Portugal; Tangiers.

a–b. ♀ & yg.	Madrid.	Lord Lilford [P.].
c–g. ♂, ♀, & yg.	S. Spain.	Brussels Museum [E.].
h–i. Hgr.	Spain.	Lord Lilford [P.].
k. Skeleton.	Spain.	
l–m. Hgr.	Tangiers.	
n. ♂.	N. Africa?	

4. SALAMANDRINA.

Salamandrina, *Fitzing. Neue Classif. Rept.* p. 41; *Tschudi, Batr.* p. 93; *Dum. & Bibr.* ix. p. 68; *Strauch, Salam.* p. 53.
Seiranota, *Barnes, Amer. Journ.* xi. p. 268; *Gray, Cat.* p. 29.

Tongue large, subtriangular, free everywhere except on the anterior half of the median line. Palatine teeth in two series, parallel anteriorly, diverging behind. A strong, bony, fronto-squamosal arch. Toes four. Tail slightly compressed.
Italy.

1. Salamandrina perspicillata.

Seiranota perspicillata, *Gray, Cat.* p. 29.
Salamandra tridactyla, *Daud. Rept.* viii. p. 261.
Molge tridactylus, *Merr. Tent.* p. 188.
Salamandra perspicillata, *Savi, Mem.* 1820.
Salamandrina perspicillata, *Fitzing. Neue Class. Rept.* p. 66; *Gravenh. Delic.* p. 88; *Tschudi, Batr.* p. 93; *Dum. & Bibr.* p. 69, pl. 94. f. 2; *De Betta, Mem. Ist. Venet.* xi. p. 528; *Lessona, Proc. Zool. Soc.* 1868, p. 254; *Strauch, Salam.* p. 53; *De Betta, Faun. Ital., Rett. Anf.* p. 80; *Schreib. Herp. Eur.* p. 69; *Wiedersh. An. Mus. Gen.* vii. p. 5, pls. 1–11.
Seiranota condylura, *Barnes, Am. Journ.* xi. p. 268.
—— perspicillata, *Bonap. Faun. Ital.*

Palatine series forming a ⅄, commencing on a line with the choanæ. Head very distinct from neck, longer than broad, greatest width at posterior corners of eyes; snout short, rounded; canthus rostralis angular; loreal region vertical; eyes large, prominent; no labial lobes. Body subquadrangular, thrice or thrice and a half the length of the head; the vertebræ and ribs very distinct through the skin; no dorsal crest. Limbs weak; fingers and toes short, depressed; carpal and tarsal tubercles distinct. Tail much longer than head and body, slightly compressed, keeled above and beneath. Cloaca as in *Salamandra*. Skin closely tuberculate above and beneath; no parotoids; no gular fold. Upper surfaces black; a transverse yellow marking, triangular or chevron-shaped, the point directed backwards, between the eyes; throat black; chin white; belly white, generally with irregular black spots. Anal region and lower half of tail carmine.

	♂.	♀.	
Total length	79	100	millim.
From snout to cloaca	31	40	„
Head	8	8½	„
Width of head	6	7	„
Fore limb	10	11	„
Hind limb	11	12	„
Tail	48	60	„

Italy.

a. Several spec., ♂ ♀.	Lucca	J. Bowring, Esq. [P.].
b–c. ♀.	Liguria.	Milan Museum [E.].
d–g. Bad state.	Italy.	Prof. Savi.
h–i. ♀.	Dalmatia (?)	Hr. Jeitteles [P.].

5. TYLOTOTRITON.

Tylototriton, *Anderson, Proc. Zool. Soc.* 1871, p. 423, *and West. Yunnan Exped., Zool. Res.* p. 848.

Tongue small, subcircular, free on the sides and slightly behind. Palatine teeth in two oblique series, meeting in front. A thick, bony fronto-squamosal arch; maxillary reaching quadrate; pterygoid applied to the maxillary. Toes five. Tail compressed.

Yunnan; Himalayas.

1. Tylototriton verrucosus.

Tylototriton verrucosus, *Anders. ll. cc., Yunn.* pl. 76. f. 6 and pl. 77.

Palatine series forming a Λ, commencing on a line with, or a little in front of, the choanæ. Head broader than long, surrounded by a prominent osseous porous ridge; a short similar ridge along the parietals; snout short, broad; eyes moderate; no labial lobes. Body thrice to thrice and a half the length of the head; no dorsal crest; a broad, prominent, porous vertebral ridge, produced by the great development and transverse dilatation of the spinous processes of the dorsal vertebræ; a series of sixteen knob-like porous glands along the side, the last three being behind the leg when it is extended at right angles to the body. Limbs moderate; fingers and toes free, depressed. Tail as long as or a little longer than head and body, strongly compressed, with an upper and lower crest, ending in a point. Anal opening a longitudinal slit, the borders not much swollen. Skin tubercular; parotoids large, very distinct; a strong gular fold. Uniform blackish brown, paler on the lips, snout, chin, throat, and under surface of the limbs; lower edge of tail orange-yellow.

	♂.	♀.	
Total length	146	148	millim.
From snout to cloaca	66	72	„
Head	16	16	„
Width of head	18	18	„
Fore limb	27	26	„
Hind limb	28	27	„
Tail	80	76	„

Mountains of Yunnan; Eastern Himalayas.

a. ♀.	Nantin valley, W. Yunnan.	Dr. Anderson [P.].
b, c. ♀.	Yunnan, 4500 feet.	
d–g. ♂, ♀, & yg.	Darjeeling.	W. T. Blanford, Esq. [P.].

6. PACHYTRITON.

Pachytriton, *Boulenger*, *Bull. Soc. Zool. France*, 1878, p. 72.

Tongue large, covering the floor of the mouth, adherent, its anterior border slightly free. Palatine teeth in two oblique series, meeting in front. Fronto-squamosal arch present, ligamentous posteriorly; pterygoid united suturally with maxillary. Toes five. Tail cylindrical at the base, compressed at the end.

China.

1. Pachytriton brevipes. (Plate I.)

Triton brevipes, *Sauvage*, *Bull. Soc. Philom.* (7) i. p. 116.
Pachytriton brevipes, *Bouleng. l. c.*

Skull narrow anteriorly; nasals widely separated by nasal processes of premaxillaries; frontals with much-developed orbital processes directed towards, but not reaching, the squamosals; exoccipitals large; the pterygoids and maxillaries so united as to seem to form a single bone. Palatine teeth forming a Λ, the summit on a line with the choanæ. Head depressed, fish-like; mouth not deeply cleft, with much-developed labial lobes; eye small; upper eyelid little developed; snout rounded; head a little longer than broad, the greatest width at temporal regions. Body rather depressed, about four times the length of the head; no dorsal crest. Limbs short, clumsy; fingers and toes very short and obtuse, depressed, free; no carpal or tarsal tubercles. Tail as long as head and body, cylindrical in its anterior third, then becoming strongly compressed and furnished with a low crest; its end rounded. Vent-opening longitudinal, its borders not swollen, with long cilia in the breeding male. Skin quite smooth; parotoid region thickened, not porous; a distinct gular fold. Olive-brown above, punctate all over with blackish; tips of fingers and toes and lower surfaces yellowish, the latter regions punctate with blackish.

Total length	187	millim.
From snout to cloaca	92	„
Head	20	„
Width of head	18	„
Fore limb	23	„
Hind limb	25	„
Tail	95	„

South Kiansi.

a. ♀. S. Kiansi. Paris Museum [E.].

Subfam. B. *AMBLYSTOMATINÆ.*

Molgidæ, Plethodontidæ, part., *Gray, Cat. Batr. Grad.*
Amblystomidæ, Ellipsoglossidæ, *Hallow. Journ. Ac. Philad.* (2) iii. 1858.
Amblystominæ, Hynobiinæ, *Cope, Proc. Ac. Philad.* 1859.
Amblystomidæ, Hynobiidæ, *Cope, Journ. Ac. Philad.* (2) vi. 1866.
Salamandrida lechriodonta, part., *Strauch, Rev. d. Salam., in Mém. Ac. St. Pétersb.* (7) xvi. no. 4.

Synopsis of the Genera.

I. Series of palatine teeth converging backwards, forming a ⋁-shaped figure.

Toes five ..... 7. **Hynobius**, p. 31.

Toes four ..... 8. **Salamandrella**, p. 34.

II. Series of palatine teeth uninterrupted, doubly arched, forming a ⋀⋀-shaped figure.

Fingers and toes with black claws .... 9. **Onychodactylus**, p. 35.

III. Series of palatine teeth in two arches convex forwards, separated by a wide interspace.

Palatine series short, between the choanæ; toes five. 10. **Ranidens**, p. 36.

Palatine series short, between the choanæ; toes four. 11. **Batrachyperus**, p. 37.

Palatine series long, converging backwards. 12. **Dicamptodon**, p. 38.

IV. Series of palatine teeth in a nearly straight line or an angle, not separated in the middle by a wide interspace.

Tongue with radiating plicæ..... 13. **Amblystoma**, p. 38.

7. HYNOBIUS.

Pseudosalamandra, *Tschudi, Batr.* p. 91.
Hynobius, *Tschudi, l. c.* p. 94; *Gray, Cat.* p. 30.
Molge, *Bonap. Faun. Ital.*; *Gray, l. c.* p. 31.
Ellipsoglossa, *Dum. & Bibr.* ix. p. 97; *Strauch, Salam.* p. 54.

Tongue large, elliptical, lateral borders free, anterior border slightly free. Palatine teeth in two long series, converging backwards, meeting in an acute angle, with two short recurved branches in front, thus forming a ⋁-shaped figure. Toes five. Tail cylindrical at the base, compressed at the end.
Japan.

Synopsis of the Species.

Fifth toe well developed; body elongate, more than four times the length of the head; tail feebly compressed ..... 1. *nævius*, p. 32.

Fifth toe well developed; body shorter, not four times the length of the head; tail strongly compressed ..... 2. *nebulosus*, p. 32.
Fifth toe rudimentary ..... 3. *peropus*, p. 33.

1. Hynobius nævius.

Molge striata, *Gray, Cat.* p. 31.
Salamandra nævia, *Schleg. Faun. Japon., Amph.* p. 122, pl. 4. f. 4–6, pl. 5. f. 9–10, *and Abbild.* pl. 39. f. 4.
Pseudosalamandra nævia, *Tschudi, Batr.* p. 92.
Molge striata, *Bonap. Faun. Ital.*
Ellipsoglossa nævia, *Dum. & Bibr.* p. 99, pl. 101. f. 5; *Strauch, Salam.* p. 55.

The length of the palatinė series, from anterior border to posterior angle, equals two thirds or three fourths the width of the tongue. Head depressed, longer than broad; snout short, rounded; eyes large, prominent; no labial lobes. Body cylindrical, slightly depressed, about four and a half times the length of the head. Limbs moderate, the adpressed limbs not meeting; fingers and toes short, depressed, free; fifth toe well developed, half the length of fourth; carpal and tarsal tubercles indistinct. Tail shorter than head and body, thick, the end rounded. Vent a longitudinal slit; in the male with a small papilla and a short transverse slit anteriorly; the borders not swollen. Skin smooth, shining; sides with thirteen very distinct vertical or costal grooves, more or less distinct across the belly; parotoids large, flat, behind the angle of the jaws; a rectilinear groove from the eye to the gular fold; latter strongly marked; back with a longitudinal groove. Blackish grey, lighter beneath; sides variegated with light grey.

	♂.	♀.	
Total length.....	131	122	millim.
From snout to cloaca ..	78	74	„
Head	14	14	„
Width of head	12	12	„
Fore limb.....	18	18	„
Hind limb	22	22	„
Tail	53	48	„

Japan.

a–d. ♂ ♀. Japan. Leyden Museum.

2. Hynobius nebulosus.

Hynobius nebulosus, *Gray, Cat.* p. 30.
Salamandra nebulosa, *Schleg. Faun. Japon., Amph.* p. 127, pl. 4. f. 7–9, *and Abbild.* pl. 40. f. 7–10.
Hynobius nebulosus, *Tschudi, Batr.* p. 94.
Ellipsoglossa nebulosa, *Dum. & Bibr.* p. 100; *Strauch, Salam.* p. 55.

Differs from the preceding in the following characters:—Eyes smaller; body much shorter, only about thrice and a half the length of the head; tail strongly compressed and keeled in the posterior two thirds, ending in a point. Reddish brown, speckled or variegated with dark brown above, with greyish beneath; tail blackish, upper and lower keels yellow.

	♂.	♀.	
Total length	99	102	millim.
From snout to cloaca	56	55	„
Head	12	12	„
Width of head	10	10	„
Fore limb	15	13	„
Hind limb	17	16	„
Tail	43	47	„

Japan.

a–b. ♂.	Japan.	Leyden Museum.
c. ♀.	Japan.	A. Adams, Esq. [C.].
d. Young.	Nikko, C. Japan.	C. Maries [C.].

3. Hynobius peropus. (Plate II. fig. 1.)

The length of the palatine series, from anterior border to posterior angle, equals half the width of the tongue. Head depressed, longer than broad; snout short, rounded; eyes rather large, prominent; no labial lobes. Body cylindrical, slightly depressed, nearly four times the length of the head; the distance from snout to gular fold three times in the distance from latter to cloaca. Limbs moderate, not meeting when adpressed; fingers and toes more elongate than in the preceding species; fifth toe rudimentary, tubercle-like; carpal and tarsal tubercles indistinct. Tail shorter than head and body, strongly compressed and keeled in its posterior half, ending in a point. Vent (of male) three slits meeting in front, the median longitudinal and longest, the two others obliquely directed forwards, forming an angle; the borders not swollen. Skin smooth; thirteen costal grooves; a median dorsal groove; parotoids indistinct; gular fold distinct; no fold from eye to gular fold. Reddish brown above, speckled and minutely marbled with dark brown; tail dark brown, with lichen-like grey variegation; yellowish brown beneath; belly speckled with lighter.

Total length	109	millim.
From snout to cloaca	59	„
Head	12	„
Width of head	9	„
Fore limb	15	„
Hind limb	17	„
Tail	50	„

a. ♂.	China or Japan.	A. Adams, Esq. [C.].

8. SALAMANDRELLA.

Salamandrella, *Dybowsky, Verh. zool.-bot. Ges. Wien*, 1870, p. 237.
Isodactylium, *Strauch, Salam.* p. 55.

Tongue large, elliptical, lateral borders free, anterior border slightly free. Palatine teeth in two series converging backwards, meeting in an acute angle, with two short recurved branches in front, thus forming a ∿-shaped figure. Toes four. Tail compressed.
Eastern Siberia.

1. Salamandrella keyserlingii.

Salamandrella keyserlingii, *Dybowsky, l. c.* pl. 7.
Isodactylium schrenckii, *Strauch, l. c.* p. 56, pl. 2. f. 1.

Median branches of palatine teeth slightly curved, with the convexity outwards; recurved branches directed backwards. Head moderately depressed, longer than broad; snout rounded; eyes rather large, prominent; no labial lobes. Body slightly depressed, thrice and two thirds to four times and a third the length of the head. Limbs rather short, not meeting when adpressed against the body; fingers and toes rather short, depressed, free; carpal and tarsal tubercles indistinct. Tail as long as, or shorter than the head and body, strongly compressed, keeled, the end rounded. Cloaca a longitudinal slit with swollen borders, subspherical. Skin smooth; twelve or thirteen costal grooves, extending across the belly; a median dorsal groove; parotoids large, flat, behind the angle of the jaws; a groove from the eye to the gular fold, which is strongly marked. Brown, lighter beneath; median zones of body immaculate, bordered by an undulous blackish line; a blackish vertebral line; sides with small dark spots.

	♂.	♀.	
Total length	95	126	millim.
From snout to cloaca	52	63	„
Head	11	12	„
Width of head	9	9½	„
Fore limb	13	16	„
Hind limb	15	18	„
Tail	43	63	„

Ussuri and Schilka Rivers; Lake Baikal.

a. ♂.	River Schilka.	St. Petersburg Museum [E.].
b Several spec.: ♂, ♀, & yg.	Lake Baikal.	Warsaw Museum [E.].
c–d. ♀.	Lake Baikal.	Godeffroy Museum.

2. Salamandrella wosnessenskyi.

Isodactylium wosnessenskyi, *Strauch, l. c.* p. 58, pl. 2. f. 2.

Very closely allied to the preceding, from which it differs in

having the outer branches of palatine teeth more horizontal and the median series more approximating, not curved; besides, the tail is less elevated. Judging from the unique specimen in the collection, I am not convinced of the specific difference of this form.

Kamtschatka.

a. ♀. Kamtschatka. St. Petersburg Museum [E.].

9. ONYCHODACTYLUS.

Onychodactylus, *Tschudi, Batr.* p. 92; *Gray, Cat.* p. 33; *Dum. & Bibr.* ix. p. 113; *Strauch, Salam.* p. 60.

Tongue large, subcircular, the lateral borders free. Palatine teeth in a doubly arched, ⋀-shaped series on a line with the choanæ. Fingers and toes furnished with claws; toes five. Tail cylindrical at the base, compressed at the end.

Japan.

1. Onychodactylus japonicus.

Onychodactylus japonicus, *Gray, Cat.* p. 33.

Salamandra japonica, *Houttuyn, Verh. Genootsch. Vlissing.* ix. p. 329, pl. —. f. 3.

—— unguiculata, *Schleg. Faun. Japon., Rept.* p. 123, pl. 5. f. 1–6.

Onychodactylus schlegeli, *Tschudi, l. c.*; *Dum. & Bibr.* p. 114, pl. 93. f. 1.

—— japonicus, *Bonap. Faun. Ital.*; *Strauch, l. c.*; *Troschel, Arch. f. Nat.* 1877, p. 199, pl. 15.

Head small, longer than broad; snout rounded; eyes large, prominent; no labial lobes. Body cylindrical, about four times the length of the head. Limbs moderate; in the male the hind limb very strong and with a broad fibulo-tarsal dilatation; fingers and toes short, depressed; carpal and tarsal tubercles none. Tail longer than head and body, cylindrical in its anterior half, becoming gradually compressed and keeled towards the end, which is obtusely pointed. Vent of female a longitudinal slit; of male three slits meeting in front, the median being longitudinal, the two others obliquely directed forwards, forming an angle; the borders of the vent not swollen in either sex. Skin smooth; twelve to fourteen costal grooves, which may be very indistinct; parotoids present, large, flat, behind the angle of the jaws; a rectilinear groove from the eye to the gular fold, which is strongly marked; throat with more or less distinct longitudinal plaits. Brown above; a broad zone along the back and tail yellowish or reddish, mottled with brown, bordered by a blackish band, the upper edge of which is well defined and irregularly festooned; flanks and limbs dark brown, variegated with greyish; nails black; head brownish, variegated with blackish; lower surfaces light brown, uniform or mottled with darker.

	♂.	♀.	
Total length	166	156	millim.
From snout to cloaca	71	73	„
Head	13	14	„
Width of head	9½	11	„
Fore limb	20	21	„
Hind limb	25	24	„
Tail	95	83	„

Japan.

a–b. ♂ & larva.	Japan.		
c–d. ♀.	Oyama, near Yeddo.	H.M.S. 'Challenger'	[C.].
e. Several spec.: ♂, ♀, & larvæ.	Near Hakone, Niphon.	H.M.S. 'Challenger'	[C.].

10. RANIDENS.

Ranodon, *Kessler, Bull. Mosc.* 1866, p. 126; *Strauch, Salam.* p. 65.

Tongue rather large, subcircular, the lateral borders free. Palatine teeth in two short transverse arched series, convex forwards, between the choanæ, separated from each other by a wide interspace. Toes five. Tail compressed.

Eastern Temperate Asia.

1. Ranidens sibiricus.

Triton (Ranodon) sibiricus, *Kessler, l. c.* pl. vii.
Ranodon kessleri, *Ballion, Bull. Mosc.* 1868, p. 138.
—— sibiricus, *Strauch, l. c.* p. 66, pl. ii. f. 3.

Head rather depressed, a little longer than broad; snout rounded; eyes moderately large, prominent; labial lobes slightly developed. Body rounded, thrice and a half to thrice and two thirds the length of the head. Limbs moderate; fingers and toes rather short, depressed, free; the extremity of the adpressed hind limb reaches the wrist of the adpressed fore limb. Tail as long as, or a little longer than head and body, strongly compressed, crestless, keeled above, obtusely pointed. Vent a longitudinal slit, in the male with a small papilla anteriorly, the borders not swollen. Skin shining, minutely tuberculate above; sides with eleven to thirteen very distinct vertical grooves; a more or less distinct fold of the skin running perpendicularly to the costal grooves along each flank; parotoids present, large, flat, behind the angle of the jaws; a groove from the eye to the parotoid; a strong gular fold. Light brown above, with more or less distinct darker spots; beneath whitish, immaculate.

	♂.	
Total length	180	millim.
From snout to cloaca	85	„
Head	18	„
Width of head	16	„

Fore limb	27 millim.
Hind limb	29 „
Tail	95 „

Eastern Siberia; North-eastern China.

a, b. ♂ & hgr.	Kopal.	St. Petersburg Museum [P.].

11. BATRACHYPERUS.

Batrachuperus, *Bouleng. Bull. Soc. Zool. France*, 1878, p. 71.

Tongue rather large, subcircular, the lateral borders free. Palatine teeth in two short transverse arched series between the choanæ, separated from each other by a wide interspace. Toes four. Tail compressed.

China.

1. Batrachyperus sinensis. (PLATE III. fig. 1.)

Salamandrella sinensis, *Sauvage, Bull. Soc. Philom.* (7) i. p. 117.
Batrachuperus sinensis, *Bouleng. l. c.* p. 72.

Head depressed, longer than broad; snout very short, rounded; eyes rather large, prominent; labial lobes much developed. Body cylindrical, about thrice and a half the length of the head. Limbs moderate; fingers and toes rather short, depressed, free; the limbs being adpressed along the body, the median fingers and toes meet. Tail a little shorter than head and body, strongly compressed, except at the base, crestless, keeled, ending in an obtuse point. Vent much as in *Onychodactylus*, viz. a simple longitudinal slit in the female, two perpendicular slits in the male, the horizontal one anterior and arched; the borders not swollen. Skin smooth; sides with ten to twelve very distinct vertical grooves; parotoids present, large, flat, behind the angle of the jaws; a rectilinear groove from the eye to the gular fold; latter very strongly marked, extending on the sides of the neck; throat with longitudinal plaits. Greyish brown above, more or less variegated with blackish; lower surfaces lighter, mottled with brown.

	♂.	♀.	
Total length	147	135	millim.
From snout to cloaca	75	70	„
Head	17	16	„
Width of head	14½	13	„
Fore limb	19	19	„
Hind limb	26	24	„
Tail	72	65	„

Moupin, China.

a–b. ♂ ♀.	Moupin.	Paris Museum [E.].

12. DICAMPTODON.

Dicamptodon, *Strauch, Salam.* p. 68.

Tongue nearly entirely adherent. Palatine teeth in two long transverse arched series, convex forwards, converging backwards, situated behind the line of the choanæ, separated from each other by a wide interspace. Toes five. Tail compressed.

California.

1. Dicamptodon ensatus.

Triton ensatus, *Eschscholtz, Zool. Atlas*, p. 6, pl. 22.
Dicamptodon ensatus, *Strauch, l. c.* p. 69.

Head broad; snout rounded. Body stout. Limbs short; toes free. Tail sword-shaped, curved upwards, as long as head and body. Skin nearly smooth; parotoids and costal grooves apparently absent. Reddish-brown, back marbled with brown. Total length about 4 decimetres.

California.

13. AMBLYSTOMA.*

Amblystoma, *Tschudi, Batr.* p. 92; *Baird, Journ. Ac. Philad.* (2) i. 1850, p. 281; *Gray, Cat.* p. 34; *Dum. & Bibr.* ix. p. 101; *Cope, Proc. Ac. Philad.* 1867, p. 166; *Strauch, Salam.* p. 60.
Xiphonura, *Tschudi, l. c.* p. 95; *Gray, l. c.*; *Dum. & Bibr.* p. 161.
Salamandroides, *Fitzing. Syst. Rept.* p. 33.
Heterotriton, *Gray, l. c.* p. 33.
Desmiostoma, *Sager, Penins. Journ. Medic.* 1858, p. 428.
Camarataxis, *Cope, Proc. Ac. Philad.* 1859, p. 122.
Pectoglossa, *Mivart, Proc. Zool. Soc.* 1867, p. 698.

Larval Forms:—

Siredon, *Wagl. Syst. Amph.* p. 209; *Dum. & Bibr.* p. 176.
Axolotes, *Owen, Ann. & Mag. N. H.* xiv. p. 23.

Tongue subcircular or oval, with radiating plicæ; lateral borders free; anterior border slightly free. Palatine teeth in long series, continuous or separated by slight interspaces. Toes five. Tail more or less compressed.

North America, southward to Mexico; one species from Siam, probably at a great altitude.

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* The three following species are referred, for completeness' sake, to this genus, but not without uncertainty, as nothing precise is said in the description of the arrangement of the palatine teeth or of the attachment of the tongue:—
Salamandra brevicauda, Wied, Nova Acta Leop.-Carol. xxxii. p. 127.—Pennsylvania.
S. maculata, id. ibid. p. 129.—Pennsylvania.
S. melanoleuca, id. ibid. p. 130.—Pennsylvania.

Synopsis of the Species.

I. Series of palatine teeth extending to external fissure of choanæ; plicæ of tongue radiating from behind.

A. Costal grooves ten or eleven.

10 costal grooves; habit very stout; blackish, blotched or marbled with grey ..... 1. *talpoideum*, p. 40.

11 costal grooves; habit stout; blackish, with grey fasciæ ..... 2. *opacum*, p. 40.

10 or 11 costal grooves; blackish, with round yellow spots ..... 3. *punctatum*, p. 41.

11 costal grooves; habit slender; tail shorter than the head and body; lead-coloured, with small yellow spots .. 4. *conspersum*, p. 42.

11 costal grooves; body stout and heavy; two very distinct tarsal tubercles; blackish above, with large irregular yellow spots; yellow beneath. 5. *bicolor*, p. 42.

11 costal grooves; head large; parotoids very distinct; uniform brown . 12. *paroticum*, p. 48.

B. Costal grooves twelve.

1. Two distinct tarsal tubercles.

Head large; brown or blackish, with yellow markings ..... 6. *tigrinum*, p. 43.

Head smaller; canthus rostralis distinct; tail considerably longer than head and body ..... 7. *xiphias*, p. 45.

Palatine teeth in four distinct patches, with decided intervals ..... 8. *trisruptum*, p. 45.

2. No or one indistinct tarsal tubercle.

Head small; body much elongated; limbs not meeting when adpressed.. 9. *jeffersonianum*, p. 46.

Head small; body less elongated; limbs meeting when adpressed ..... 10. *persimile*, p. 47.

Limbs nearly meeting when adpressed; a light vertebral band; toes long .. 11. *macrodactylum*, p. 48.

II. Series of palatine teeth not extending beyond choanæ; plicæ of tongue radiating from behind.

12 costal grooves; snout short, uniform black..... 13. *aterrimum*, p. 49.

12 costal grooves; snout long; brown, marbled with darker ..... 14. *tenebrosum*, p. 49.

14 costal grooves; brown, with light spots on the sides; below yellowish.. 15. *texanum*, p. 50.

III. Series of palatine teeth between the choanæ; plicæ of tongue radiating from a median longitudinal groove; fourteen costal grooves.

Lower jaw shorter than snout..... 16. *cingulatum*, p. 50.
Lower jaw longer than snout ..... 17. *microstomum*, p. 50.

1. Amblystoma talpoideum.

Amblystoma? talpoideum, *Gray, Cat.* p. 36.
Salamandra talpoidea, *Holbr. N. Amer. Herp.* v. p. 73, pl. 24.
Amblystoma talpoideum, *Dum. & Bibr.* p. 109; *Cope, Proc. Ac. Philad.* 1867, p. 172; *Strauch, Salam.* p. 63.

Shortest, stoutest, and most clumsily formed of all the *Amblystomata*. Differs from *A. opacum* in the following characters:— Head broader; upper jaw visible beyond the lower, when viewed from below; eyes rather small. Tail higher. Ten costal grooves. Dark brownish or liver-black; upper surfaces irregularly sprinkled, blotched and marbled with silvery grey of a lichen-like character. Size of *A. opacum*.

S.E. United States.

2. Amblystoma opacum.

Amblystoma opacum, *Gray, Cat.* p. 36.
Salamandra opaca, *Gravenh. Uebers. Zool. Syst.* p. 431, *and Delic.* p. 75, pl. 10; *Dum. & Bibr.* p. 66.
—— fasciata, *Green, Journ. Ac. Philad.* i. 1818, p. 350; *Holbr. N. Amer. Herp.* v. p. 71, pl. xxiii.; *Dekay, N. Y. Faun., Rept.* p. 77, pl. 17. f. 40.
Ambystoma opaca, *Baird, Journ. Ac. Philad.* (2) i. 1850, p. 283.
—— fasciatum, *Dum. & Bibr.* p. 106, pl. 101. f. 5.
Amblystoma opacum, *Cope, Proc. Ac. Philad.* 1867, p. 173; *Strauch, Salam.* p. 63.

Palatine teeth in three series on a line behind the choanæ; median series in a double arc, the convexity of which is turned backwards; lateral series about half the length of the central, separated from the latter by a decided interval. Tongue large, plicæ radiating from behind. Head depressed, a little longer than broad, greatest width at angles of jaws; snout broad, rounded, without canthus rostralis; eyes moderate. Body slightly depressed, measuring twice and a half or twice and two thirds the distance from tip of snout to gular fold. Limbs moderate; adpressed against the body, the longest fingers and toes meet; fingers and toes not very thick, depressed; carpal and tarsal tubercles generally indistinct. Tail shorter than head and body, thick at the base, becoming gradually compressed at the pointed tip, not keeled. Skin shining, closely pitted, especially on back and tail; parotoids indistinct; a strong gular fold; a rectilinear fold from the angle of the mouth to the latter; eleven costal grooves. Purplish black; back and upper half of tail with bluish-grey transverse bars.

	♂.	♀.	
Total length	90	94	millim.
From snout to cloaca	49	55	„
Head	12	13	„
Width of head	9	11	„
Fore limb	14	77	„
Hind limb	16	19	„
Tail	41	39	„

United States, from Pennsylvania to Florida, to Wisconsin, and to Texas.

a. ♂.	New York.	
b. ♀.	Ohio.	
c–d. ♀ & hgr.	Georgia.	
e–f. ♀.	N. America.	Dr. MacMurtrie [P.].
g–h. ♂.	N. America.	Prof. St. George Mivart [P.].
i. ♀.	N. America.	Royal College of Surgeons [P.].
k–l, m, n, o. ♂ ♀.	N. America.	
p. Skeleton.	New York.	

3. Amblystoma punctatum.

Ambystoma carolinæ, *Gray, Cat.* p. 35.
Lacerta punctata, *Linn. S. N.* i. p. 370.
—— maculata, *Shaw, Zool.* iii. p. 304.
Salamandra venenosa (*Bart.*), *Daud. Rept.* viii. p. 229; *Holbr. N. Amer. Herp.* v. p. 67, pl. 22.
Lacerta subviolacea, *Barton, Amer. Phil. Trans.* vi. p. 108, pl. 4. f. 6.
Salamandra subviolacea, *Harlan, Journ. Ac. Philad.* v. p. 317; *Dekay, N. Y. Faun., Rept.* p. 74, pl. 2. f. 36.
Ambystoma subviolaceum, *Tschudi, Batr.* p. 92.
—— punctata, *Baird, Journ. Ac. Philad.* (2) i. p. 283.
Ambyostoma carolinæ, *Gray, Proc. Zool. Soc.* 1853, p. 11.
Ambystoma argus, *Dum. & Bibr.* p. 103.
Amblystoma punctatum, *Cope, Proc. Ac. Philad.* 1867, p. 175; *Strauch, Salam.* p. 63.

Palatine teeth in three series; median series generally in a straight line or a double arc, the convexity of which is turned backwards, sometimes forming a single arc; lateral series a little in advance of the central and not quite half its length, separated from the latter by a slight interval. Tongue large, plicæ radiating from behind. Head depressed, a little longer than broad; greatest width at angles of jaws; snout broad, rounded, without canthus rostralis; eyes moderate. Body stout, cylindrical, twice and two thirds to thrice and one fourth the distance from tip of snout to gular fold. Limbs moderate; adpressed against the body, the median fingers and toes meet in the male, remain generally separated in the female; fingers and toes not very thick, depressed; carpal and tarsal tubercles scarcely distinct. Tail about as long as head and body, compressed, pointed, not keeled. Skin shining, more or less pitted; parotoids rather distinct; a vertical groove behind the

angle of the mouth, crossed by another horizontal groove from the eye to the strong gular fold; ten or eleven costal grooves. Black, lighter beneath; on each side of the head, back, and tail a series of nearly circular yellow spots about the size of the orbit; limbs with similar spots.

	♂.	♀.	
Total length	132	183	millim.
From snout to cloaca	62	93	„
Head	14	20	„
Width of head	12	18	„
Fore limb	17	22	„
Hind limb	19	26	„
Tail	70	90	„

Eastern United States.

a. ♀.	New York.	
b–c. ♂ ♀.	Ohio.	
d. ♂.	St. Lawrence.	G. Barnston, Esq. [P.].
e. ♀.	New Jersey.	
f. ♂.	U. States.	
g, h, i, k–l. Several spec.: ♂, ♀, hgr., & yg.	N. America.	
m. ♀.	N. America.	Prof. St. George Mivart [P.].
n. Skeleton.	——?	

4. Amblystoma conspersum.

Amblystoma conspersum, *Cope, Proc. Ac. Philad.* 1859, p. 123, *and* 1867, p. 177; *Strauch, Salam.* p. 63.

Palatine teeth in three patches, the median longest, commencing opposite inner margin of choanæ and convex to between latter or nearly so. Tongue longer than broad. In proportions intermediate between *A. punctatum* and *A. jeffersonianum*. Head a broad oval. Limbs short; fingers and toes long and slender, subcylindrical; when adpressed, the fingers reach beyond bases of toes; two small tubercles on edges of sole. Tail shorter than head and body, everywhere compressed. Skin smooth; grooves behind the orbit inconspicuous, but present; eleven costal grooves. General colour leaden, paler beneath; lower parts of sides and sides of tail more or less varied with small whitish spots, the former often in a regular line; a similar line on the upper part of the sides sometimes present; end of snout sometimes pale-marbled. Total length 31 lines.

United States—Pennsylvania to Georgia.

a. Several larvæ. Carlisle, Pennsylvania. Smithsonian Institution [P.].

5. Amblystoma bicolor.

Amblystoma bicolor, *Hallow. Proc. Ac. Philad.* 1857, p. 215; *Cope, eod. loc.* 1867, p. 178; *Strauch, Salam.* p. 63.

Palatine teeth in three entirely transverse series, the interruption

taking place considerably inside the line of the choanæ; median series notched behind; the teeth themselves are in numerous rows on each of their bony crests, presenting a brush-like arrangement. Tongue large, plicæ radiating from behind. Head broad and obtuse, entering the length to the groin $3\frac{2}{3}$ times. Body stout and heavy. Limbs stout; the adpressed limbs overlap by the length of the toes; fingers and toes not elongate, depressed; two well-marked plantar tubercles. Tail much compressed, a little shorter than head and body. Skin smooth; folds of throat and side of head not strongly marked; eleven costal grooves. Colour above olive-brown, below yellowish, olive-shaded in the middle; the inferior yellow rises on the sides as short blotches; above them are several ill-defined yellowish spots; parotoid region yellow, with a distinct black vertical bar; limbs brown cross-banded; tail yellow with brown spots. Total length 5 inches 10 lines.

New Jersey.

6. Amblystoma tigrinum.

Heterotriton ingens, *Gray, Cat.* p. 33.
Xiphonura jeffersoniana, *id. ibid.* p. 34.
Ambystoma tigrinum, *id. ibid.* p. 35.
Ambystoma mavortium, *id. ibid.* p. 37.

Salamandra tigrina, *Green, Journ. Ac. Philad.* v. p. 116.
—— ingens, *Green, l. c.* vi. p. 254.
—— lurida, *Baird, Amer. Journ.* xxxvi. p. 322.
Triton tigrinus, *Holbr. N. Amer. Herp.* v. p. 79, pl. 26; *Dekay, N. Y. Faun.* p. 83, pl. 15. f. 32.
—— ingens, *Holbr. l. c.* p. 85, pl. 29.
Ambystoma tigrina, *Baird, Journ. Ac. Philad.* (2) i. p. 284; *Dum. & Bibr.* p. 108; *Hallow. Journ. Ac. Philad.* (2) iii. p. 350.
—— lurida, *Baird, l. c.*; *Hallow. l. c.* p. 353.
—— mavortia, *Baird, l. c.* pp. 284, 292; *Hallow. l. c.* p. 352.
—— episcopus, *Baird, l. c.* pp. 284, 293; *Hallow. l. c.* p. 354.
Ambystoma californiense, *Gray, Proc. Zool. Soc.* 1853, p. 11, pl. 7; *Hallow. l. c.* p. 355; *Baird, Rep. U.S. Expl. Surv.* xiii. part iv. pl. 30. f. 1–3.
Ambystoma fasciatum, var., *Dum. & Bibr.* p. 107, pl. 105. f. 1.
—— nebulosum, *Hallow. l. c.* p. 352.
—— ingens, *Hallow. l. c.* p. 353; *Cooper, U.S. Expl. Surv.* xii. part ii. pl. 31. f. 2.
—— proserpine, *Hallow. l. c.* p. 354; *U.S. Mex. Bound. Surv.* ii., *Rept.* pl. 35. f. 7–14.
—— maculatum, *Hallow. l. c.* p. 355, *and Proc. Ac. Philad.* 1857, p. 215.
Desmiostoma maculatum, *Sager, Penins. Journ. Medic.* 1858, p. 428.
Camarataxis maculata, *Cope, Proc. Ac. Philad.* 1859, p. 122.
Amblystoma tigrinum, *Cope, Proc. Ac. Philad.* 1867, p. 179; *Strauch, Salam.* p. 63.
—— mexicanum, *Cope, l. c.* p. 184; *Strauch, l. c.* p. 64.
—— mavortium, *Cope, l. c*; *Strauch, l. c.*; *Cope, in Yarrow's Report, Zool.* p. 631.
—— obscurum (*Baird*), *Cope, l. c.* p. 192; *Strauch, l. c.*
—— weismanni, *Wiedersh. Zeitschr. wiss. Zool.* xxxii. p. 216, pls. 11, 12.

LARVAL OR "AXOLOTL" STATE.

Gray, Cat. p. 49.

Daud. Rept. viii. p. 237; *Cuv. in Humb. Rec. Zool.* pls. 12, 14; *Home, Phil. Trans. R. S.* xxi. p. 419, pls. 21, 22, 23.
Gyrinus mexicanus, *Shaw, Nat. Misc.* 1800, p. 343.
Siren pisciformis, *Shaw, Zool.* iii. p. 612, pl. 140. f. 12.
Phyllhydrus pisciformis, *Gray, Griff. A. K.* ix. p. 108.
Hypochton pisciformis, *Gravenh. Delic.* p. 90.
Siredon axolotl, *Wagl. Syst. Amph.* p. 209, *and Descr. Icon. Amph.* pl. 20.
Axolotes guttatus, *Owen, Ann. & Mag. N. H.* 1844, xiv. p. 23.
Siredon mexicanus, *Baird, Journ. Ac. Philad.* (2) i. p. 292.
—— lichenoides, *Baird, in Stansbury, Exped. Gr. Salt Lake Utah*, p. 336, pl. 1, *and Rep. U.S. Expl. Surv.* xiii. part iv. pl. 44. f. 1.
—— humboldtii, *Dum. & Bibr.* p. 177.
—— harlanii, *Dum. & Bibr.* p. 181, pl. 95.
—— dumerilii, *Dugès, Ann. Sc. Nat.* (5) xv. p. 2, pl. 10.
—— tigrinus, *Velasco, Nat. Mex.* iv. pl. —.

[On metamorphoses, *cf.* A. Dum. C. R. 1865, lx. p. 765, and lxi. p. 775, and Nouv. Arch. Mus. ii. 1866, p. 265; Marsh, Amer. Journ. (2) xlvi. p. 364; Tegetmeier, Proc. Zool. Soc. 1870, p. 160; Cope, Amer. Journ. i. 1871, p. 80; Weismann, Zeitschr. wiss. Zool. xxv. p. 297; Chauvin, *eod. loc.* xxvii. p. 522.]

Arrangement of the palatine teeth extremely variable; the series continuous or slightly interrupted externally or medially, either in a straight line, or an angle directed forwards, or an arch with the convexity forwards, with all possible intermediate forms; these series extending externally to posterior outer border of choanæ. Tongue large, plicæ radiating from behind. Head depressed, as long as broad; greatest width at angles of jaws; snout broad, rounded, without canthus rostralis; eyes moderate. Body stout, slightly depressed, thrice to thrice and a half the distance from tip of snout to gular fold. Limbs stout; adpressed against the body, the median fingers and toes meet or cross; fingers and toes short, much depressed, pointed; carpal and tarsal tubercles perfectly distinct. Tail longer than, as long as, or shorter than head and body, strongly compressed, keeled posteriorly, ending in a point. Skin shining, minutely granulate; parotoids large, flat; a vertical groove behind the angle of the mouth, crossed by another horizontal groove from the eye to the gular fold, latter very strong; twelve well-marked costal grooves. Brown or blackish, lighter beneath, with more or less numerous irregular yellow spots, sometimes arranged in transverse bands.

	♂.	♀.	
Total length	138	214	millim.
From snout to cloaca	73	107	„
Head	11	25	„
Width of head	11	24	„
Fore limb	28	32	„
Hind limb	28	38	„
Tail	65	107	„

United States; Mexico.

A. *Axolotl form.*

a–b. ♂ ♀.	Lake Chalco, near Mexico.	Robert James, Esq. [P.].
c. Several spec., hgr.	Lake of Mexico.	G. H. White, Esq. [P.].
d, e–g, h–l, m–q. ♂, ♀, & hgr.	City of Mexico.	Mr. Doorman [C.].
r. Hgr.	Mexico.	Rev. F. L. Hopkins [P.].
s. ♂.	Mountain-lakes of California.	C. Darwin [P.].
t–v. ♂ ♀.	—— ?	Prof. Owen [P.].
w, x. ♂ ♀.	Bred in Paris.	Dr. A. Günther [P.].
y, z. Hgr. & yg.	Bred in England.	Dr. A. Günther [P.].

B. *Perfect form.*

a. ♂.	New Jersey.	
β. ♀.	Kansas.	
γ. ♂.	N. America.	Leyden Museum.
δ. ♀.	Volcano of Orizaba.	M. Sallé [C.].
ε–η. Young.	Ciudad.	Mr. A. Forrer [C.].
θ–ι. ♂ ♀.	Bred in the Jardin des Plantes.	Paris Museum [E.].
κ–λ. Hgr.	—— ?	Prof. St. George Mivart [P.].
μ. Hgr.	—— ?	

7. Amblystoma xiphias.

Amblystoma xiphias, *Cope, Proc. Ac. Philad.* 1867, p. 192; *Strauch, Salam.* p. 64.

Differs from *A. tigrinum* in the smaller head, distinct canthus rostralis, and longer tail, which considerably exceeds the rest of the animal. Yellowish-olive, brighter yellow beneath, with more or less anastomosing or reticulating bands of well-defined brown on the back and sides, and a few rounded spots of the same on the belly.

Columbus, Ohio.

8. Amblystoma trisruptum.

Amblystoma trisruptum, *Cope, Proc. Ac. Philad.* 1867, p. 194; *Strauch, Salam.* p. 64.

Palatine teeth in four distinct patches, with decided intervals; they form one transverse series, nearly straight centrally, where they are in a line with the posterior border of the choanæ, but curving slightly backwards laterally; the two central patches are wider than the lateral, which vary a little in length, and are separated by an interval half the diameter of the choanæ; their distance from the exterior patches is about twice as great, the centre of the interval falling about opposite to the inner border of choanæ; the outer patches extend about half a diameter beyond the outer border of choanæ. Head very broad, much depressed, ovate, rather pointed anteriorly. The remaining characters not different from those of *A. tigrinum*. Uniform dark blackish or bluish brown, with a single

series of large transversely elliptical blotches of yellow from head to tip of tail, the foremost one rounded and placed behind the eyes; those of opposite sides nearly meet on the back, and are confluent on the upper edge of the tail.

Ocate River, New Mexico.

9. Amblystoma jeffersonianum. (Plate II. fig. 2.)

Salamandra jeffersoniana, *Green, Contr. Maclurian Lyceum*, p. 4; *Holbr. N. Amer. Herp.* v. p. 51, pl. 14.
Xiphonura jeffersoniana, *Tschudi, Batr.* p. 93; *Dum. & Bibr.* p. 161.
Triton niger, *Dekay, N. Y. Faun.* iii. p. 85, pl. 15. f. 35.
Salamandra granulata, *Dekay, l. c.* p. 78, pl. 23. f. 66; *Holbr. N. Amer. Herp.* v. p. 63.
Ambystoma jeffersoniana, *Baird, Journ. Ac. Philad.* (2) i. p. 283.
Amblystoma jeffersonianum, *Cope, Proc. Ac. Philad.* 1867, p. 195; *Strauch, Salam.* p. 64.

Palatine teeth in four scarcely interrupted series forming a nearly straight line; these series extending laterally beyond the outer border of the choanæ. Tongue large, plicæ radiating from behind. Head small, not much depressed, longer than broad; greatest width at eyes; snout long and broad, rounded, without canthus rostralis; eyes moderate. Body much elongate, four times the distance from snout to gular fold. Limbs moderate, not meeting when adpressed against the body; fingers and toes depressed, latter long; a small tarsal tubercle. Tail about as long as head and body, rather strongly compressed, not keeled, ending in a point. Skin shining, smooth or minutely granulate; parotoids indistinct; a strong gular fold; twelve costal grooves, extending across the belly. Dark brown, lighter beneath; sides with or without small light blue spots.

Total length	145	millim.
From snout to cloaca	72	„
Head	13	„
Width of head	10	„
Fore limb	17	„
Hind limb	21	„
Tail	73	„

Canada; United States—Pennsylvania and Ohio, and northward.

a. ♀. Montreal.

Var. fuscum.

Ambystoma fuscum, *Hallow. Journ. Ac. Philad.* (2) iii. p. 355.
Amblystoma jeffersonianum, var. fuscum, *Cope, Proc. Ac. Philad.* 1867, p. 197.

Dark brown, with an especially dark shade or band along the sides; extremely minute white points upon the body and tail, more sparse upon the former; chin yellow, clouded with brown beneath.

Indiana and Virginia.

VAR. **laterale.**

Ambystoma laterale, *Hallow. l. c.* p. 352.
Amblystoma jeffersonianum, var. laterale, *Cope, l. c.*

About half the size of the typical form. Black with large white spots on the sides and tail, and smaller ones on the belly.
Canada; N.E. United States.

VAR. **platineum.**

Amblystoma platineum, *Cope, l. c.* p. 198; *Strauch, Salam.* p. 65.
—— jeffersonianum, subsp. platineum, *Cope, Check-list*, p. 26.

Distinguished by the narrower head and more elongate body. Colour leaden; eyelids yellowish-margined; lower surfaces with or without numerous indistinct whitish blotches.
Ohio.

10. Amblystoma persimile.

Plethodon persimilis, *Gray, Proc. Zool. Soc.* 1859, p. 230, pl. 19. f. 2; *Günth. Rept. Brit. Ind.* p. 439.
Pectoglossa persimilis, *Mivart, Proc. Zool. Soc.* 1867, p. 698.
Amblystoma persimile, *Strauch, Salam.* p. 65.

Palatine teeth in four scarcely interrupted series forming a nearly straight line; these series extending laterally beyond the outer border of the choanæ. Tongue rather large, plicæ radiating from behind. Head small, moderately depressed, longer than broad; greatest width at angles of jaws; snout moderate, rounded, without canthus rostralis; eyes moderate. Body elongate, cylindrical, thrice and a half the distance from snout to gular fold. Limbs moderate; when adpressed against the body, the tip of third finger meets the tip of fourth toe; fingers and toes long, slender, scarcely depressed; carpal and tarsal tubercles not distinct. Tail shorter than head and body, moderately compressed, not keeled, ending in a point. Skin smooth; parotoids indistinct; a strong gular fold; twelve costal grooves. Blackish, with small scattered whitish spots, largest on the sides.

Total length	98	millim.
From snout to cloaca	53	,,
Head	11	,,
Width of head	9	,,
Fore limb	16	,,
Hind limb	18	,,
Tail	45	,,

Siam.

a–b. ♀?	Siam (probably at a considerable altitude).		M. Mouhot [C.].

11. Amblystoma macrodactylum.

Ambystoma macrodactyla, *Baird, Journ. Ac. Philad.* (2) i. p. 292, *and U.S. Expl. Surv.* xii. part ii. pl. 31. f. 3.

Amblystoma macrodactylum, *Cope, Proc. Ac. Philad.* 1867, p. 198; *Strauch, Salam.* p. 65.

Palatine teeth in three [or four] series, the central largest, separated from the others by a considerable interval, together forming a line, slightly angular anteriorly, where they reach to about opposite the centre of the choanæ, laterally passing a little the outer margin of the choanæ. Tongue longitudinally oval, plicæ radiating from behind. Head rather large, depressed, and a little longer than broad ; eyes prominent. Body cylindrical-depressed. When adpressed along the body, the limbs almost meet. Toes long. Carpal and tarsal tubercles indistinct. Tail somewhat compressed, subround. Skin smooth ; twelve costal grooves. Ground-colour dark brown ; a broad light dorsal band ; sides and lower surfaces sprinkled with greyish. From snout to cloaca 58 millim.

Oregon ; California.

a. ♀ ? Oregon. Smithsonian Institution [P.].

12. Amblystoma paroticum. (Plate II. fig. 3.)

Amblystoma paroticum (*Baird*), *Cope, Proc. Ac. Philad.* 1867, p. 200; *Strauch, Salam.* p. 65.

Palatine teeth in four scarcely interrupted series, the central forming a very open angle, the lateral extending externally beyond the outer border of the choanæ. Tongue small, circular ; plicæ radiating from behind. Head large, depressed, about as broad as long, greatest width at angles of jaws, considerably constricted at the neck ; snout rounded, without canthus rostralis ; eyes large, very prominent. Body rounded, rather short, twice and two thirds the distance from snout to gular fold. Limbs strong ; adpressed against the body, the longest toe reaches the wrist-joint ; fingers and toes moderate, depressed, latter more equal in length than in the other species of the genus ; carpal and tarsal tubercles indistinct Tail a little longer than head and body, strongly compressed, keeled, ending in a point. Skin smooth ; sides corrugated ; a distinct, large parotoid gland ; a strong gular fold ; a groove from eye to latter ; eleven costal grooves. Uniform dark reddish brown, paler beneath.

Total length	144	millim.
From snout to cloaca	69	„
Head	16	„
Width of head	15	„
Fore limb	23	„
Hind limb	25	„
Tail	75	„

Vancouver's Island and Washington Territory.

a. ♂ ? Vancouver's Island. Lieut.-Col. Hawkins [C.].

13. Amblystoma aterrimum.

Amblystoma aterrimum, *Cope, Proc. Ac. Philad.* 1867, p. 201; *Strauch, Salam.* p. 65.

The series of palatine teeth commence only opposite the middle of the posterior margin of the choanæ, and describe a slight curve round their inner margins to a point just in advance of their anterior, then turn abruptly inwards and slightly backwards, making a right angle with their previous course; they converge, but do not unite. Tongue large, plicæ radiating from behind. Head a broad oval, intermediate in form between *A. tenebrosum* and *A. tigrinum*; canthus rostralis distinct. Limbs very stout, just meeting when laid along the side; toes short and flattened. Tail short and stout, much compressed, shorter than head and body. Gular fold well marked; twelve indistinct costal grooves. Black above, lead-coloured below. Total length 165 millim.

Northern Rocky Mountains.

14. Amblystoma tenebrosum.

Amblystoma tenebrosum, *Baird & Gir. Proc. Ac. Philad.* 1852, p. 174, *and U.S. Expl. Surv.* xii. part ii. pl. 31. f. 1; *Cope, Proc. Ac. Philad.* 1867, p. 202; *Strauch, Salam.* p. 65.

Xiphonura tenebrosa, *Gir. U.S. Expl. Exped., Herp.* p. 14, pl. 1. f. 9–17.

Palatine teeth in two nearly straight series, each slightly convex anteriorly, separated by a distinct interval; these series situated just behind the line of the choanæ, not extending beyond their outer margin. Tongue large, plicæ radiating from behind. Head very large, depressed, a little longer than broad; greatest width at angles of jaws; snout long and broad, rounded, without canthus rostralis; eyes large. Body somewhat depressed, three times the distance from tip of snout to gular fold. Limbs strong; when adpressed against the body the longest toe marks the wrist-joint; fingers and toes short, much depressed; carpal and tarsal tubercles indistinct. Tail shorter than head and body, strongly compressed, sharp-edged, except at the base, ending in a point. Skin smooth; no parotoids; a strong gular fold; twelve costal grooves. Greyish brown above, marbled with dark brown; dirty white beneath, immaculate.

Total length	150	millim.
From snout to cloaca	82	„
Head	20	„
Width of head	18	„
Fore limb	24	„
Hind limb	30	„
Tail	68	„

Oregon; California.

a. Hgr. ♀.	Sumass Lake (*J. K. Lord*).	N. A. Boundary Commission

Siredon gracilis, Baird, Rep. U.S. Expl. Surv. xiii. part iv. p. 13, pl. 44. f. 2, is perhaps the larva of *A. tenebrosum*.

15. Amblystoma texanum.

Salamandra texana, *Matthes, Allgem. deutsche naturh. Zeitung*, i. 1855, p. 266.

Amblystoma texanum, *Baird, U.S. Mex. Bound. Surv.* ii. *Rept.* p. 29, pl. 35. f. 15; *Cope, Proc. Ac. Philad.* 1867, p. 204; *Strauch, Salam.* p. 65.

Palatine teeth forming an arched series between choanæ, extending to their anterior border, and not beyond their inner border in the lateral direction. Tongue small, (in young) plicæ radiating from behind. General proportions as in *A. microstomum*. Head oval, rather flattened and broad; canthus rostralis somewhat marked. Skin quite smooth; no parotoids; gular fold slight; fourteen costal grooves. Above light brown, with a series of light spots along upper part of sides; these are small, and one between each pair of costal folds; sides and belly yellow. Total length 95 millim.

Texas.

16. Amblystoma cingulatum.

Amblystoma cingulatum, *Cope, Proc. Ac. Philad.* 1867, p. 205; *Strauch, Salam.* p. 65.

Differs from *A. microstomum* in the shape of the snout, which is narrowed and projects beyond the mandible. Black, the under surfaces thickly speckled with grey; a vertical narrow grey line passes between every pair of costal grooves, and meets its fellow on the dorsal line, or bifurcates to meet a similar bifurcation in like manner, embracing an area; these narrow annuli extend nearly as far forwards as the orbits, and surround the tail to its extremity. (*Cope.*)

South Carolina.

? *a*. Uniform blackish. New Orleans. Edw. Doubleday, Esq. [P.].

17. Amblystoma microstomum. (Plate II. fig. 4.)

Ambystoma porphyriticum, *Hallow. Proc. Ac. Philad.* 1856, p. 8 (*nec* Salamandra porphyritica, *Green*).

Amblystoma microstomum, *Cope, Proc. Ac. Philad.* 1867, p. 206; *Strauch, Salam.* p. 65.

Palatine teeth forming a slightly angular series, with convexity forwards, entirely between the choanæ. Tongue not very large, oval, with a median longitudinal groove, from which the plicæ radiate. Head very small, very convex, slightly longer than broad; snout very short, broad, rounded, without canthus rostralis; lower jaw projecting a little beyond the border of upper; eyes moderate. Body cylindrical, much elongate, four and a half times the distance from snout to gular fold. Limbs short, widely separated when laid

against body; fingers and toes moderate, cylindrical-depressed; carpal and tarsal tubercles indistinct. Tail shorter than head and body, subcylindrical at the base, becoming strongly compressed at the end, which is obtuse. Skin shining, minutely pitted; no parotoids; a strong gular fold; fourteen costal grooves, extending across the body. Brownish black, a little paler beneath, sometimes with greyish lichen-like spots on the sides.

Total length	111	millim.
From snout to cloaca	59	„
Head	10½	„
Width of head	9½	„
Fore limb	14	„
Hind limb	16	„
Tail	52	„

United States—Austro-riparian and Eastern districts, west of the Alleghanies.

a–c. ♀.	S. Illinois.	Smithsonian Institution [P.]. (As *Amblystoma jeffersonianum.*)
d, e. ♀.	N. America.	

Axolotes maculata, Owen, Ann. & Mag. N. H. 1844, xiv. p. 23; Gray, Cat. p. 50.

This larva I am not able to refer to any of the known species.

a.	Mexico.	Prof. R. Owen [P.].

Subfam. C. *PLETHODONTINÆ.*

Plethodontidæ, part., *Gray, Cat. Batr. Grad.*
Plethodontidæ, Bolitoglossidæ, Hemidactylidæ, *Hallow. Journ. Ac. Philad.* (2) iii. 1858.
Spelerpinæ, *Cope, Proc. Ac. Philad.* 1859.
Plethodontidæ, *Cope, Journ. Ac. Philad.* (2) vi. 1866, *and Proc. Ac. Philad.* 1869.
Salamandrida Lechriodonta, part., *Strauch, Rev. d. Salam., in Mém. Ac. St. Pétersb.* (7) xvi. no. 4.

Synopsis of the Genera.

I. Tongue attached along the median line to the anterior margin.

Maxillary and mandibular teeth very large, few in number, compressed ..... 14. **Anaides**, p. 52.

Teeth normal; toes five ..... 15. **Plethodon**, p. 53.

Toes four ..... 16. **Batrachoseps**, p. 58.

II. Tongue free all round, attached by its central pedicel only.

Toes five ..... 17. **Spelerpes**, p. 60.

Toes four ..... 18. **Manculus**, p. 75.

14. ANAIDES.

Anaides, *Baird, Iconogr. Encyclop.* ii. 1849, p. 256; *Cope, Proc. Ac. Philad.* 1869, p. 109; *Strauch, Salam.* p. 74.

Tongue large, attached along the median line, the sides extensively free. Palatine teeth in a chevron-shaped series behind the choanæ; parasphenoid teeth in an elongate patch. Maxillary and mandibular teeth few in number, compressed, knife-shaped. Toes five. Tail cylindrical.

Western North America.

1. Anaides lugubris.

Taricha? lugubris, *Gray, Cat.* p. 26.
Ambystoma punctulatum, *id. ibid.* p. 37.
Salamandra lugubris, *Hallow. Journ. Ac. Philad.* 1848, p. 126.
Anaides lugubris, *Baird, Iconogr. Encycl.* ii. 1849, p. 256; *Baird & Gir. Proc. Ac. Philad.* 1853, p. 302; *Baird, U.S. Explor. Exped., Herp.* pl. i. f. 26–33, *and Rep. U.S. Expl. Surv.* xiii. part iv. pl. 30. f. 4; *Cope, Proc. Ac. Philad.* 1869, p. 109; *Strauch, Salam.* p. 75.

Palatine teeth in two short series obliquely converging and meeting behind, not extending outwards beyond the choanæ; parasphenoid teeth in an elongate patch, narrowed anteriorly. 10 to 12 teeth in the upper jaw, 6 to 10 in the mandible. Head oval, longer than broad, greatest width at temporal regions; snout narrowed, truncate; eyes very large, prominent; interorbital space narrow; maxillary outline strongly recurved posteriorly, much like what is seen in the Crocodiles. Body somewhat depressed, measuring twice and a half to twice and a third the distance from tip of snout to gular fold. Limbs moderate, meeting when adpressed against the body; fingers and toes free, dilated at the tips, inner short but well developed; no carpal or tarsal tubercles. Tail about as long as head and body, cylindrical, slightly compressed towards the end. Anal opening longitudinal, the borders not swollen. Skin smooth; no parotoids; a strong gular fold; thirteen costal grooves. Dark brown or lead-coloured above, yellowish white beneath; sides and limbs with scattered whitish dots.

Total length	154	millim.
From snout to cloaca	76	,,
Head	17	,,
Width of head	15	,,
Fore limb	22	,,
Hind limb	25	,,
Tail	78	,,

Pacific Region of North America.

a–b, c–d. Adult, hgr., & yg.	California.	
e. Adult.	Farallone Islands.	Hr. Gruber.
f. Hgr.	Monterey.	(Type of *Amblystoma punctulatum.*)
g. Skeleton.	California.	

2. Anaides ferreus.

Anaides ferreus, *Cope, Proc. Ac. Philad.* 1869, p. 109.

Smaller and more slender than the last. The parasphenoid patch does not extend quite forwards to the middle of the orbits, and is much flatter and wider anteriorly than in *A. lugubris*. Body slender, cylindric. Limbs, and especially digits, slender; adpressed to the side they fail to meet by the length of the fingers; thumb not distinct. Fourteen costal grooves. Sides and nape greenish grey; top of head and dorsal region behind in the form of a serrate band, with the tail black; below yellowish brown, unspotted. Total length 90 millim.

Oregon.

15. PLETHODON.

Plethodon, *Tschudi, Batr.* p. 92; *Baird, Journ. Ac. Philad.* (2) i. p. 282; *Gray, Cat.* p. 38; *Dum. & Bibr.* ix. p. 82; *Cope, Proc. Ac. Philad.* 1869, p. 99; *Strauch, Salam.* p. 69.
Sauropsis, *Fitzing. Syst. Rept.* i. p. 33.
Cylindrosoma, part., *Dum. & Bibr.* p. 76.
Ensatina, *Gray, Cat.* p. 76.
Heredia, *Girard, Proc. Ac. Philad.* 1856, p. 140; *Strauch, Salam.* p. 76.
Stereochilus, *Cope, l. c.* p. 100.
Urotropis, *Espada, An. Soc. Esp.* iv. p. 70.

Tongue large, attached along the median line, extensively free laterally and more or less behind. Palatine teeth in two more or less distinctly arched series behind the choanæ; parasphenoidal teeth in two elongate patches. Toes five. Tail subcylindrical or compressed.

North America: (one species in the valley of the Rio de la Plata?).

Synopsis of the Species.

I. Parasphenoid patches well separated; tongue free in its posterior half.

11 costal grooves; the length of the parasphenoid patches equals the distance from their anterior border to the intermaxillary teeth; uniform brown	1. *oregonensis*, p. 54.
11 costal grooves; the length of the parasphenoid patches equals about the distance from their anterior border to the choanæ; brown above, with yellow spots	2. *platensis*, p. 55.

13 costal grooves; black, with red-orange spots above; bright red-orange below. 3. *croceater*, p. 55.

II. Parasphenoid patches in contact throughout; tongue, posterior border free.

13 costal grooves; palatine series very oblique, not extending outwards beyond choanæ; habit moderate; black, with large yellowish spots . . . . . 4. *flavipunctatus*, p. 55.

14 costal grooves; palatine series slightly oblique, extending outwards beyond choanæ; habit moderate; black with small greyish spots . . . . . 5. *glutinosus*, p. 56.

13 costal grooves; palatine series not extending outwards beyond choanæ; body elongate, limbs weak; a broad reddish-brown dorsal band . . . . . 6. *intermedius*, p. 57.

16–18 costal grooves; palatine series not extending outwards beyond choanæ; body much elongate, limbs very weak; generally a reddish-brown dorsal band . 7. *erythronotus*, p. 57.

1. Plethodon oregonensis.

Ensatina eschscholtzii, *Gray, Cat.* p. 48 (*nec* Triton ensatus, *Eschsch.*).
Heredia oregonensis, *Girard, Proc. Ac. Philad.* 1856, p. 235, *and U.S. Explor. Exped., Herp.* pl. i. f. 18–25; *Strauch, Salam.* p. 76.
Plethodon ensatus, *Cope, Proc. Ac. Philad.* 1867, p. 167.
—— oregonensis, *Cope, Proc. Ac. Philad.* 1869, p. 100.

Palatine teeth in two strongly curved series, meeting at a right angle backwards, extending outwards a good deal beyond choanæ; parasphenoid teeth in two elongate patches diverging backwards, well separated from each other posteriorly, and from palatine teeth series; the length of the parasphenoid patches equals the distance from their anterior border to the intermaxillary teeth. Tongue very large, suboval, attached narrowly along the anterior half of the median line. Head moderate, convex, longer than broad, greatest width at angles of jaws; snout rounded, projecting a little beyond lower jaw; margin of lower jaw slightly projecting below the eyes; latter very large, prominent. Body cylindrical, short, measuring only twice or twice and one third the distance from tip of snout to gular fold. Limbs well developed; when laid against the body, the fingers and toes intercross; fingers and toes moderate, obtuse, free, inner very short; no carpal or tarsal tubercles. Tail cylindrical at the base, slightly compressed at the end, a little shorter than head and body. Skin smooth, shining; no parotoids; a strong, arched gular fold, meeting a rectilinear groove from the eye; eleven costal grooves. Uniform reddish brown, lighter beneath.

Total length	127 millim.
From snout to cloaca	67 ,,
Head	15 ,,
Width of head	12½ ,,
Fore limb	21 ,,
Hind limb	24 ,,
Tail	60 ,,

Oregon; California.

a–c. ♀ & yg. Monterey. (Types of *Ensatina eschscholtzii*.)

2. Plethodon platensis.

Urotropis platensis, *Espada, An. Soc. Esp.* iv. p. 71, pl. 1.

General characters as in *P. oregonensis*, but the tongue smaller, the parasphenoid patches shorter, and the inner fingers and toes longer. Dark brown above, with irregular yellow spots; lower surfaces of a dirty carneous tint.

Rio de la Plata (?)

3. Plethodon croceater.

Plethodon croceater, *Cope, Proc. Ac. Philad.* 1867, p. 210, & 1869, p. 100; *Strauch, Salam.* p. 70.

Dentition and tongue as in *P. oregonensis*. Head very broad; snout truncate, projecting considerably beyond lower jaw; margin of lower jaw projecting beyond upper below the eyes. Body and limbs as in *P. oregonensis*. Tail a little longer than head and body. Skin very smooth; thirteen costal grooves. Colour pitchy black, fading into bright red-orange below; limbs orange, with a blackish cross band below the knee; a large red-orange spot on each parotoid region, and four smaller irregular similar spots on the body to base of tail, on each side of and near the vertebral line; a pair of orange spots at base of tail and a distant series on the upper face of the tail. Total length 125 millim.

Fort Tejon, California.

4. Plethodon flavipunctatus.

Plethodon flavipunctatus, *Strauch, Salam.* p. 71.

Palatine teeth in two very oblique series converging backwards, separated from each other by a slight interspace, not extending outwards beyond choanæ; parasphenoid teeth in two elongate patches in contact throughout, widely separated from the palatine teeth. Tongue very large, posterior border free. Head rather long, with a median longitudinal groove. Body cylindrical. Limbs as in *P. glutinosus*, but the fingers more slender and more pointed. Tail

cylindrical, a little shorter than head and body. Skin smooth ; thirteen costal grooves. Black, with large irregular yellowish spots, more numerous on the sides and on the upper part of the tail, smaller on the throat and belly, absent on the upper surface of the head and the lower surface of the tail. Total length 117 millim.

California.

5. Plethodon glutinosus.

Plethodon glutinosum, *Gray*, *Cat.* p. 39.
Salamandra glutinosa, *Green*, *Journ. Ac. Philad.* i. p. 357 ; *Holbr. N. Amer. Herp.* v. p. 39, pl. 10; *Dekay*, *N.Y. Faun.*, *Rept.* p. 81, pl. 17. f. 42.
—— variolata, *Gilliams*, *Journ. Ac. Philad.* i. p. 460.
—— cylindracea, *Harlan*, *Journ. Ac. Philad.* v. p. 156.
Plethodon glutinosus, *Tschudi*, *Batr.* p. 92 ; *Cope*, *Proc. Ac. Philad.* 1869, p. 100 ; *Strauch*, *Salam.* p. 70.
Triton porphyriticus, *Dekay*, *N.Y. Faun.*, *Rept.* p. 83, pl. 16. f. 37.
Cylindrosoma glutinosum, *Dum. & Bibr.* p. 80.

Series of palatine teeth slightly curved, converging backwards at a very open angle, separated from each other by a wide interspace, extending outside of choanæ ; parasphenoid teeth in two elongate patches in contact throughout, widely separated from the palatine teeth ; the length of the parasphenoid patches equals the distance from their anterior border to the tip of the snout, or the distance between the outer extremities of the palatine series. Tongue large, free in the posterior fourth of its extent. Head rather small, depressed, longer than broad ; greatest width at angles of jaws ; snout rounded ; eyes large, prominent. Body cylindrical, elongate, thrice to thrice and two thirds the distance from stout to gular fold. Limbs moderate, not meeting when adpressed against the body ; fingers and toes short, the tips slightly swollen ; no carpal or tarsal tubercles. Tail cylindrical, about the length of head and body. Anal opening longitudinal, the borders not swollen. Skin shining, closely pitted ; parotoids indistinct ; a strong gular fold ; a more or less distinct rectilinear groove from eye to latter ; fourteen costal grooves. Black ; generally with small greyish blotches, larger and sometimes confluent on the flanks.

	♂.	♀.	
Total length	129	138	millim.
From snout to cloaca	65	73	„
Head	12	13	„
Width of head	10½	11	„
Fore limb	16	17	„
Hind limb	18	19	„
Tail	64	65	„

United States—Eastern and Austro-riparian districts.

a–b. ♀.	Ohio.	
c. ♂.	Pennsylvania.	J. Green, Esq. [P.].
d–e. ♂ ?	S. Carolina.	

f–h. ♂ & hgr.	N. America.	Edw. Doubleday, Esq. [P.].
i. ♀.	N. America.	
k. ♂.	N. America.	Prof. St. George Mivart [P.].

6. Plethodon intermedius.

Plethodon intermedius (*Baird*), *Cope, Proc. Ac. Philad.* 1867, p. 209, & 1869, p. 100; *Strauch, Salam.* p. 72.

Palatine teeth in two oblique series converging backwards, separated from each other by a wide interspace, not extending outwards beyond choanæ; parasphenoid teeth in two elongate patches in contact throughout, widely separated from the palatine teeth; the length of the parasphenoid patches equals the distance from their anterior border to the tip of the snout. Tongue large, posterior border free. Head small, longer than broad; snout rounded; eyes large, prominent. Body cylindrical, elongate, about thrice and a half the distance from snout to gular fold. Limbs short; fingers and toes short, obtuse, free, inner rudimental; no carpal or tarsal tubercles. Tail compressed, about the length of head and body. Skin smooth; parotoids indistinct; a distinct gular fold; thirteen costal grooves. Colour as in *P. erythronotus*.

Total length	81 millim.
From snout to cloaca	40 „
Head	8 „
Width of head	6 „
Fore limb	8½ „
Hind limb	11 „
Tail	41 „

Vancouver's Island; British Columbia.

a–b. ♀ & yg.	Fraser's River.	H.M.S. 'Plumper.'

7. Plethodon erythronotus.

Ambystoma erythronotum, *Gray, Cat.* p. 37.
Salamandra erythronota, *Green, Journ. Ac. Philad.* i. p. 356; *Holbr. N. Amer. Herp.* v. p. 43, pl. 11; *Dekay, N.Y. Faun., Rept.* p. 75, pl. 16. f. 38; *Wied, Nova Acta Leop.-Carol.* xxxii. p. 126.
—— cinerea, *Green, l. c.*
Plethodon cinereus, *Tschudi, Batr.* p. 92.
—— erythronotus, *Baird, Journ. Ac. Philad.* (2) i. p. 285; *Dum. & Bibr.* p. 86; *Cope, Proc. Ac. Philad.* 1869, p. 100; *Strauch, Salam.* p. 72.

Palatine teeth in two oblique series, converging backwards, separated from each other by a wide interspace, not extending outwards beyond choanæ; parasphenoid teeth in two elongate patches in contact throughout, widely separated from the palatine teeth; the length of the parasphenoid patches is more than the distance from their anterior border to the tip of the snout, or equals the dis-

tance between the anterior corners of eyes. Tongue large, free in the posterior half of its extent. Habit very slender. Head very small, longer than broad; snout rounded; eyes rather large. Body cylindrical, much elongate, four to five times the distance from snout to gular fold. Limbs very weak; fingers and toes very short, latter webbed at the base, with slightly swollen tips, inner rudimental; no carpal or tarsal tubercles. Tail generally about as long as head and body, cylindrical. Anal opening longitudinal, the borders not swollen. Skin smooth; parotoids indistinct; a distinct gular fold; sixteen to eighteen costal grooves. Greyish or brownish above, with or without a broad reddish-brown, black-edged longitudinal band; belly greyish, speckled with brown.

	♂.	♀.	
Total length.....	82	95	millim.
From snout to cloaca	43	46	„
Head	7½	7½	„
Width of head.....	6	6	„
Fore limb.....	8	8	„
Hind limb	10	9½	„
Tail	39	49	„

East of the United States; Canada.

a, b. ♂.	New York.	
c–e. ♂ ♀.	Ohio.	
f–i. ♂ ♀.	N. America.	Edw. Doubleday, Esq. [P.].
k–l, m–p. ♂ ♀.	N. America.	T. Bell, Esq. [P.].
q–s, t–x. ♂, ♀, & yg.	N. America.	
y–z. ♀.	N. America.	Prof. St. George Mivart [P.].

16. BATRACHOSEPS.

Hemidactylium, *Tschudi, Batr.* p. 94; *Gray, Cat.* p. 41; *Cope, Proc. Ac. Philad.* 1869, p. 99; *Strauch, Salam.* p. 75.
Batrachoseps, *Bonap. Faun. Ital.*; *Gray, l. c.* p. 42; *Cope, l. c.* p. 98; *Strauch, l. c.* p. 84.
Desmodactylus, *Dum. & Bibr.* ix. p. 117.

Tongue oval, attached along the median line, more or less free behind. Palatine teeth in a chevron-shaped series behind the choanæ; parasphenoid teeth in two elongate patches. Toes four.
North America.

Synopsis of the Species.

13 costal grooves; belly yellowish, black-spotted	1. *scutatus*, p. 59.
18 costal grooves; belly uniform yellowish	2. *pacificus*, p. 59.
20 costal grooves; belly black	3. *nigriventris*, p. 60.
20 costal grooves; fore limb not reaching angle of mouth; belly brown	4. *attenuatus*, p. 60.

1. Batrachoseps scutatus.

Hemidactylium scutatum, *Gray, Cat.* p. 41.
Salamandra scutata, *Schleg. Faun. Japon., Amph.* p. 119, *and Abbild.* pl. 40. f. 4–6.
—— melanosticta, *Gibbes, Bost. Journ. N. H.* v. p. 89, pl. 10.
Hemidactylium scutatum, *Tschudi, Batr.* p. 94; *Hallow. Journ. Ac. Philad.* (2) iii. p. 366; *Strauch, Salam.* p. 76.
Desmodactylus scutatus, *Dum. & Bibr.* p. 118.
—— melanostictus, *Dum. & Bibr.* p. 119.

Tongue free in its posterior third. Series of palatine teeth not extending outwards beyond the choanæ; parasphenoid patches long, separated from each other and from palatine series by a distinct interspace. Head small; snout short, rounded; eyes large, moderately prominent. Body cylindrical, elongate, measuring about thrice and a half the distance from tip of snout to gular fold. Limbs very weak; fingers and toes very short, depressed, obtuse, united at the base; no carpal or tarsal tubercles. Tail subcylindrical at the base, compressed towards the end, longer than head and body. Anal opening longitudinal, the borders not swollen. Skin smooth; no parotoids; a strong gular fold; a groove from eye to latter; thirteen costal grooves, joined to the vertebral line by other grooves, which are curved with the convexity backwards. Brown above; a series of light dots, sometimes confluent, along each side of the back; yellowish beneath, with round black spots.

Total length	76	millim.
From snout to cloaca	36	,,
Head	7	,,
Width of head	4½	,,
Fore limb	8	,,
Hind limb	9	,,
Tail	40	,,

United States—Rhode Island to Illinois, and to the Gulf of Mexico.

a. Adult.	Niagara.	
b. Adult.	N. America.	Prof. St. George Mivart [P.].

2. Batrachoseps pacificus.

Hemidactylium pacificum, *Cope, Proc. Ac. Philad.* 1865, p. 195; *Strauch, Salam.* p. 76.
Batrachoseps pacificus, *Cope, Proc. Ac. Philad.* 1869, p. 98.

Differs from the preceding in the number of costal grooves (seventeen or eighteen); these are not prolonged dorsally. Brown above, yellowish beneath, uniform.
South California.

3. Batrachoseps nigriventris.

Batrachoseps nigriventris, *Cope, Proc. Ac. Philad.* 1869, p. 98.

Resembles the preceding in general proportions, but the limbs in more rudimental condition. Costal grooves twenty or twenty-one, extending to vertebral line, but not curved. Colour above deep brown, separated abruptly from the black of the lower surfaces; tail black.

California.

a–b. Adult. Pataluma. Smithsonian Institution [P.].

4. Batrachoseps attenuatus.

Batrachoseps attenuatus, *Gray, Cat.* p. 42.
Salamandrina attenuata, *Eschsch. Zool. Atlas*, p. 1, pl. 21. f. 1–14.
Batrachoseps attenuatus, *Bonap. Faun. Ital.*; *Cope, Proc. Ac. Philad.* 1869, p. 98; *Strauch, Salam.* p. 85.

Tongue, posterior half free; anterior attachment very delicate, easily torn. Palatine teeth in two very short series, not extending outwards beyond the inner margin of the choanæ, separated from parasphenoid patches; latter confluent. Head small; snout short, rounded; eyes moderately large. Body cylindrical, much elongate, measuring about four times the distance from tip of snout to gular fold. Limbs very weak; digits very short, rudimentary, united. Tail cylindrical, as thick as body, longer than head and body. Skin smooth, shining; no parotoids; a strong gular fold; twenty costal grooves; tail regularly ringed. Brown; a blackish band along each side of the body; back with diagonal darker cross lines.

Total length	108	millim.
From snout to cloaca	41	„
Head	6½	„
Width of head	5	„
Fore limb	6	„
Hind limb	7	„
Tail	67	„

United States, Pacific district.

a–c. Adult. San Francisco.
d–g. Adult & hgr. California.
h–k. Adult & hgr. —— ?

17. SPELERPES*.

Spelerpes, *Rafin. Atlantic Journal*, no. 1, p. 22 (*fide Baird*); *Baird, Journ. Ac. Philad.* (2) i. p. 283; *Gray, Cat.* p. 43; *Cope, Proc. Ac. Philad.* 1869, p. 104; *Strauch, Salam.* p. 77.
Geotriton, *Bonap. Faun. Ital.*; *Tschudi, Batr.* p. 93; *Gray, Cat.* p. 47; *Dum. & Bibr.* ix. p. 111; *Cope, l. c.* p. 102.
Cylindrosoma, *Tschudi, l. c.*
Oedipus, *Tschudi, l. c.*; *Gray, Cat.* p. 47; *Cope, l. c.*

* *Salamandra haldemani*, Holbr. N. Amer. Herp. v. p. 59, pl. 13.—Pennsylvania, Maryland, and Virginia.

Pseudotriton, *Tschudi, l. c.* p. 94.
Saurocercus, *Fitz. Syst. Rept.* i. p. 34.
Batrachopsis, *Fitz. l. c.*
Cylindrosoma, part., *Dum. & Bibr.* p. 76.
Bolitoglossa, *Dum. & Bibr.* p. 88.
Oedipina, *Keferst. Arch. f. Naturg.* 1868, p. 299.
Ophiobatrachus, *Gray, Ann. & Mag. N. H.* (4) ii. p. 297; *Cope, l. c.* p. 101.
? Stereochilus, *Cope, l. c.* p. 100.
Gyrinophilus, *Cope, l. c.* p. 108.

Tongue supported by the glossohyal pedicel, boletoid, free all round. Palatine teeth in two series converging backwards; parasphenoid teeth in one or two elongate patches. Toes five.

North and Central America; three species in North-west South America; one in the West Indies.

Synopsis of the Species.

I. Limbs well developed.

A. Fingers and toes free; palatine teeth confluent with parasphenoid patches.

15–17 costal grooves; no canthus rostralis; red, black-spotted ..... 1. *ruber*, p. 62.
17 costal grooves; no canthus rostralis; almost black above, shaded with yellow; a light, black-margined band from axilla to groin ..... 2. *marginatus*, p. 64.
16 or 17 costal grooves; canthus rostralis well marked; greyish brown above, canthus rostralis paler ..... 3. *porphyriticus*, p. 64.

B. Fingers and toes free; palatine teeth separated from parasphenoid patches, not extending exteriorly beyond choanæ.

13 costal grooves; tail very long; fingers and toes rather slender; yellow, black-spotted above; belly immaculate ..... 4. *longicauda*, p. 64.
13 costal grooves; tail very long; fingers and toes short; back with three black longitudinal bands ..... 5. *guttolineatus*, p. 65.
13 or 14 costal grooves; tail hardly longer than head and body, compressed; yellow, with two latero-dorsal black lines ..... 6. *bilineatus*, p. 66.
21 costal grooves; tail subround; brown, dorsal region darker ..... 7. *multiplicatus*, p. 67.
11 or 12 costal grooves; tail round; inner digits rudimentary, wing-like ..... 8. *chiropterus*, p. 67.

C. Fingers and toes slightly webbed; palatine teeth separated from parasphenoid patches, extending exteriorly beyond choanæ.

11 costal grooves; inner toe not distinct; uniform black ..... 9. *cephalicus*, p. 67.

12 costal grooves; black, with lichen-like grey variegation ..... 10. *leprosus*, p. 68.
12 costal grooves; black, with two series of yellow (or red) spots ..... 11. *bellii*, p. 68.

D. Fingers and toes extensively webbed, the tips, however, free.

10 or 11 costal grooves; series of palatine teeth extending exteriorly beyond choanæ; brownish ..... 12. *fuscus*, p. 69.
12 or 13 costal grooves; series of palatine teeth extending exteriorly beyond choanæ; black, with whitish dots ..... 13. *morio*, p. 70.
12 costal grooves; series of palatine teeth not extending exteriorly beyond choanæ; black or brown, with pale specks ..... 14. *adspersus*, p. 70.

E. Fingers and toes united to the tips.

1. Series of palatine teeth not extending exteriorly beyond choanæ.

12 costal grooves; body and tail short; brown, white-speckled beneath ..... 15. *rufescens*, p. 71.
13 costal grooves; body and tail long; uniform dark brown ..... 16. *altamazonicus*, [p. 71.
12 costal grooves; body and tail long; blackish, upper surfaces sprinkled with grey ..... 17. *yucatanicus*, p. 72.

2. Series of palatine teeth extending exteriorly beyond choanæ.

13 costal grooves; brown, sides blackish .. 18. *infuscatus*, p. 72.
12 or 13 costal grooves; blackish brown, back yellow or with yellow markings.... 19. *variegatus*, p. 73.
17 costal grooves; black, with white spots.. 20. *parvipes*, p. 74.

II. Limbs extremely small, rudimentary; body and tail worm-like.

13 or 14 costal grooves ..... 21. *lineolus*, p. 74.
19 costal grooves ..... 22. *uniformis*, p. 75.

1. Spelerpes ruber.

Spelerpes rubra, *Gray, Cat.* p. 45.
Salamandra rubra, *Daud. Rept.* viii. p. 227, pl. 92. f. 2; *Holbr. N. Amer. Herp.* v. p. 35, pl. 9; *Dekay, N.Y. Faun., Rept.* p. 80, pl. 17. f. 43.
—— maculata, *Green, Journ. Ac. Philad.* i. p. 350.
—— subfusca, *Green, l. c.* p. 351.
—— rubriventris, *Green, l. c.* p. 353 (*nec Daud.*).
Pseudotriton subfuscus, *Tschudi, Batr.* p. 95.
—— ruber, *Baird, Journ. Ac. Philad.* (2) i. p. 286.

Bolitoglossa rubra, *Dum. & Bibr.* p. 89, pl. 93. f. 2.
Pseudotriton flavissimus, *Hallow. Proc. Ac. Philad.* 1856, p. 130.
Spelerpes ruber, *Cope, Proc. Ac. Philad.* 1869, p. 107; *Strauch, Salam.* p. 83.

LARVA:

Siren operculata, *Pal. de Beauv. Amer. Phil. Trans.* iv. p. 279, pl. —. f. 3.
Proteus neocæsareanus, *Green, l. c.* p. 358.

Series of palatine teeth extending outwards beyond choanæ, confluent with parasphenoid patches; latter well separated, diverging posteriorly. Head small, longer than broad, greatest width at angles of jaws; snout short, rounded, without canthus rostralis; eyes small. Body thick, cylindrical, elongate, measuring thrice and a half to four and a half times the distance from tip of snout to gular fold. Limbs short; fingers and toes very short, obtuse, free; no carpal or tarsal tubercles. Tail shorter than head and body, cylindrical at the base, strongly compressed and keeled at the end. Skin smooth, shining; no parotoids; a strong gular fold; fifteen or sixteen costal grooves. Vermilion-red, the back sometimes brown, closely spotted with dark brown; the spots absent or reduced to dots on the lower surfaces.

	♂.	♀.	
Total length	120	166	millim.
From snout to cloaca	69	90	„
Head	14	17	„
Width of head	11	14	„
Fore limb	12½	16	„
Hind limb	16	21	„
Tail	51	76	„

United States—Eastern and Austro-riparian districts.

a, b, c–e. ♂, ♀, & larvæ.	New York.	
f–g, h–l. ♂, ♀, & larvæ.	Near Philadelphia.	
m. Skeleton.	Philadelphia.	
n. ♂.	Pennsylvania.	
o. Hgr.	S. Carolina.	Prof. Verauxen [P.].
p–s. ♀.	N. America.	Dr. J. Green [P.].
t, u. ♀.	N. America.	
v–w, x–z. ♂ & larvæ.	N. America.	Prof. St. George Mivart [P.].
α–β. ♂ & larva.	Mexico (?).	

VAR. **montanus.**

Pseudotriton montanus, *Baird, Journ. Ac. Philad.* (2) i. p. 293.

Head more elongate, occiput more convex; tail longer; seventeen costal grooves.
Alleghany Mountains, from Pennsylvania to South Carolina.

Mr. Cope (*l. c.*) distinguishes another variety, *S. sticticeps* (Baird, MS.), from South Carolina, but does not characterize it.

2. Spelerpes? marginatus.

Pseudotriton marginatus, *Hallow. Proc. Ac. Philad.* 1856, p. 130.
Stereochilus marginatum, *Cope, Proc. Ac. Philad.* 1869, p. 101.
Spelerpes marginatus, *Strauch, Salam.* p. 83.

Dentition as in *S. ruber*. Head small, depressed; no canthus rostralis. Body slender, cylindrical. Extremities weak. Tail compressed, a little shorter than head and body. Costal grooves seventeen. Dark ash-colour above, almost black, shaded obscurely with yellow; a lateral band of dusky white margined with black on each side near the abdomen, extending from the anterior to the posterior extremities; under parts dusky white, very minutely spotted or blotched with black. Total length 75 millim.

Georgia.

3. Spelerpes porphyriticus.

Spelerpes ? salmonea, *Gray, Cat.* p. 46.
Spelerpes ? porphyritica, *id. ibid.*
Salamandra porphyritica, *Green, Contr. Maclur. Lyc.* i. 1827, p. 3, pl. 1. f. 2.
—— salmonea (*Storer*), *Holbr. N. Amer. Herp.* v. p. 33, pl. 8; *Dekay, N.Y. Faun., Rept.* p. 76, pl. 16. f. 39.
Triton porphyriticus, *Holbr. l. c.* p. 83, pl. 28.
Pseudotriton salmoneus, *Baird, Journ. Ac. Philad.* (2) i. p. 287.
Ambystoma salmoneum, *Dum. & Bibr.* p. 110.
Gyrinophilus porphyriticus, *Cope, Proc. Ac. Philad.* 1869, p. 108.
Spelerpes salmoneus, *Strauch, Salam.* p. 83.

Besides certain osteological peculiarities which have been pointed out by Cope (premaxillary bones remaining distinct, basal bones well separated, peculiar prootic squamosal crest) this species differs from *S. ruber* in the larger eyes and the presence of a distinct canthus rostralis. Sixteen or seventeen costal grooves. Purplish grey above, with small, rather indistinct darker marblings; canthus rostralis paler. Lower surfaces dirty white, with or without brown dots.

Total length	161	millim.
From snout to cloaca	95	„
Head	16	„
Width of head	13	„
Fore limb	18	„
Hind limb	21	„
Tail	66	„

Alleghany Mountains, from New York to Alabama.

a–b. ♀. Carlisle, Pennsylvania. Smithsonian Institution [P.].

4. Spelerpes longicauda.

Spelerpes longicauda, *Gray, Cat.* p. 43.
Salamandra longicauda, *Green, Journ. Ac. Philad.* i. p. 351; *Holbr. N. Amer. Herp.* v. p. 61, pl. 19; *Dekay, N.Y. Faun., Rept.* p. 78, pl. 17. f. 41.

Spelerpes lucifuga, *Rafin. Atlant. Journ.* i. 1832, p. 22 (*fide Baird*).
Cylindrosoma longicauda, *Tschudi, Batr.* p. 93.
Spelerpes longicauda, *Baird, Journ. Ac. Philad.* (2) i. p. 287; *Cope, Proc. Ac. Philad.* 1869, p. 107; *Strauch, Salam.* p. 82.
Cylindrosoma longicaudatum, *Dum. & Bibr.* p. 78.

Palatine teeth forming a short chevron, not extending externally beyond choanæ, separated from parasphenoid patches by a large interspace; parasphenoid patches separated, scarcely diverging posteriorly. Head small, longer than broad, greatest width at angles of jaws; snout rounded, without canthus rostralis; eyes rather large. Body cylindrical, elongate, measuring from thrice to thrice and a half the distance from tip of snout to gular fold. Limbs short; fingers and toes rather slender, free; no carpal or tarsal tubercles. Tail much longer than head and body, slightly compressed, keeled above, becoming very thin towards the end. Skin smooth, shining; no parotoids; gular fold distinct, arched, with the convexity forwards; thirteen costal grooves. Yellow; upper surfaces with small black spots, which may be confluent in narrow cross bands on the tail; belly immaculate.

	♂.	♀.	
Total length	133	144	millim.
From snout to cloaca	49	50	„
Head	9½	9½	„
Width of head	7	7	„
Fore limb	14	15	„
Hind limb	16	16	„
Tail	84	94	„

United States—Eastern and Austro-riparian districts, except Texas.

a, b. ♂ & hgr.	Ohio.	
c. Hgr.	N. America.	Dr. J. Green [P.].
d–e. ♂ ♀.	N. America.	Edw. Doubleday, Esq. [P.].
f. ♂.	N. America.	Lord Ampthill [P.].
g. ♀.	N. America.	Prof. St. George Mivart [P.].
h. Hgr.	Mexico (?).	

5. Spelerpes guttolineatus.

Spelerpes guttolineata, *Gray, Cat.* p. 45.
Salamandra guttolineata, *Holbr. N. Amer. Herp.* v. p. 29, pl. 7.
Spelerpes guttolineatus, *Baird, Journ. Ac. Philad.* (2) i. p. 287; *Cope, Proc. Ac. Philad.* 1869, p. 107; *Strauch, Salam.* p. 82.
Cylindrosoma guttolineatum, *Dum. & Bibr.* p. 79.

Very closely allied to the preceding, differing only in the shorter fingers and toes and coloration. Yellowish above; back with three black longitudinal bands, as wide as the interspaces between them; the two outer bands commence from the eye and extend along the side of the tail; a few light dots on these bands, one between each two costal grooves; greyish beneath, clouded with darker.

Total length	149 millim.
From snout to cloaca	54 „
Head	11 „
Width of head	8½ „
Fore limb	13 „
Hind limb	16 „
Tail	95 „

North and South Carolina, Georgia, and Alabama.

a. ♂. N. America.
b. ♂. N. America. Prof. St. George Mivart [P.].

6. Spelerpes bilineatus.

Spelerpes cirrigera, *Gray, Cat.* p. 44.
Spelerpes bilineata, *id. ibid.*
Salamandra bilineata, *Green, Journ. Ac. Philad.* i. p. 352; *Holbr. N. Amer. Herp.* v. p. 55, pl. 16; *Dekay, N.Y. Faun., Rept.* p. 79, pl. 23. f. 67.
—— flavissima, *Harlan, Amer. Journ.* 1826, p. 286.
—— cirrigera, *Green, Journ. Ac. Philad.* iv. p. 253; *Holbr. l. c.* p. 53, pl. 15.
Spelerpes bilineatus, *Baird, Journ. Ac. Philad.* (2) i. p. 287; *Cope, Proc. Ac. Philad.* 1869, p. 107; *Strauch, Salam.* p. 82; *Cope, Amer. Nat.* iv. p. 401.
—— cirrigerus, *Baird, l. c.*; *Strauch, l. c.*
Bolitoglossa bilineata, *Dum. & Bibr.* p. 91.

Palatine teeth forming a short chevron, not extending externally beyond the choanæ, separated from parasphenoid patches; latter separated. Head small, longer than broad; snout rounded, without canthus rostralis; eyes rather large. Body cylindrical, elongate, measuring about thrice and a half the distance from tip of snout to gular fold. Limbs short; fingers and toes moderate, free; no carpal or tarsal tubercles. Tail as long as, or not very much longer than, head and body, compressed, keeled, ending in a point. Skin smooth, shining; no parotoids; gular fold strong, arched, with the convexity forwards; thirteen or fourteen costal grooves. Yellowish brown above, with two lateral dark brown bands, commencing from the eyes and extending along the tail; sometimes a very narrow dark brown vertical line; lower surfaces yellowish, immaculate.

	♂.	♀.
Total length	67	84 millim.
From snout to cloaca	35	38 „
Head	6	6 „
Width of head	4	4½ „
Fore limb	8	7 „
Hind limb	10	9½ „
Tail	32	46 „

United States—Eastern and Austro-riparian districts, except Texas.

a. ♀. United States.
b–c. ♂. —— ?

7. Spelerpes multiplicatus.

Spelerpes multiplicatus, *Cope, Proc. Ac. Philad.* 1869, p. 106.

Palatine teeth forming short series, each rather suddenly bent backwards, not extending outwards beyond choanæ, well separated from parasphenoid patches; latter separated. General proportions as in *Batrachoseps scutatus*. Head flat; snout rather thick and short. Fingers and toes free, short, especially inner and outer. Tail a little compressed and considerably thickened, keeled at the end. Twenty-one costal grooves. Brown, inferior surfaces paler; sometimes the brown colour forms a broad dorsal band with dark points; the sides are of a pinkish grey, and the under surfaces light yellow. Total length 82 millim.

Arkansas.

8. Spelerpes chiropterus.

Spelerpes chiropterus, *Cope, Proc. Ac. Philad.* 1863, p. 54, and 1869, p. 106; *Strauch, Salam.* p. 83.
—— orculus, *Cope, Proc. Ac. Philad.* 1865, p. 196; *Strauch, l. c.*

Series of palatine teeth arched, not extending outwards beyond the choanæ, separated from parasphenoid patches; latter separated. Head moderate; snout truncate. Body moderately elongate, measuring not quite three times the distance from snout to gular fold. Limbs moderate; fingers and toes short, free; a prominent wing-like rudiment only of the inner digit on both pairs of extremities. Tail cylindrical, slightly longer than head and body. Skin smooth; a distinct gular fold; eleven (or twelve) costal grooves. Dark brown above, with or without a reddish or yellow dorsal band; sometimes uniform black. The single specimen at my disposal is dark brown above, with two yellow dorsal bands, narrower than the space between them, commencing on the parotoid region, uniting and continuing on the tail; the lower surfaces light brown. Head and body 24 millim.; tail 26 millim.

Mexico.

a. Hgr. —— ? Prof. St. George Mivart [P.].

9. Spelerpes cephalicus.

Spelerpes cephalicus, *Cope, Proc. Ac. Philad.* 1865, p. 196, and 1869, p. 106; *Strauch, Salam.* p. 83.

The shortest and stoutest species of the genus, the form being more that of *Amblystoma opacum*. Series of palatine teeth nearly straight, not in contact, externally extending beyond choanæ, separated from

parasphenoid patches; latter distinct from each other. Snout rounded, truncate. Posterior limb stout; fingers and toes flat, depressed, margined, inner very rudimental. Tail a little shorter than head and body, swollen, little compressed, constricted at base. Skin everywhere finely wrinkled; a gular fold; eleven costal grooves. Colour dull black, paler on the sides; lips and gular region minutely marbled with ashen. Total length 65 millim.

Mexico.

10. Spelerpes leprosus.

Spelerpes leprosus, *Cope, Proc. Ac. Philad.* 1869, p. 105.

Palatine teeth in two slightly arched series, extending externally beyond choanæ, separated from parasphenoid patches by a slight interspace; parasphenoid patches narrow, well separated, diverging posteriorly. Head moderate, depressed, longer than broad; greatest width at angles of jaws; mouth rounded, without canthus rostralis; eyes moderately large. Body cylindrical, measuring three to three and a half times the distance from tip of snout to gular fold. Limbs rather weak; fingers and toes short, depressed, webbed at the base, inner very short. Tail cylindrical, about the length of head and body. Skin smooth, closely pitted; no parotoids; gular fold distinct; twelve costal grooves. Black; sides of body and tail, and sometimes back, splotched lichen-like with grey.

	♂.	♀.	
Total length	91	105	millim.
From snout to cloaca	46	53	„
Head	9½	11	„
Width of head	8	9	„
Fore limb	12	14	„
Hind limb	15	17	„
Tail	45	52	„

Mexico.

a–d. ♂ ♀.	Mexico.	M. Sallé [C.].
e–g. ♂ & yg.	Jalapa.	Mr. Hoege [C.].

11. Spelerpes bellii.

Spelerpes bellii, *Gray, Cat.* p. 46.
Bolitoglossa mexicana, *Dum. & Bibr.* p. 93, pl. 104. f. 2.
Spelerpes bellii, *Cope, Proc. Ac. Philad.* 1860, p. 372, and 1869, p. 105; *Strauch, Salam.* p. 84.

Palatine teeth in two slightly arched series, extending externally beyond choanæ, separated from parasphenoid patches by a small interspace; parasphenoid patches well separated, diverging posteriorly. Head moderate, depressed, slightly longer than broad, greatest width at angles of jaws; snout short, rounded, without canthus rostralis; eyes large. Body slightly depressed, measuring

thrice to thrice and two thirds the distance from tip of snout to gular fold. Limbs moderate; fingers and toes very short, depressed, very obtuse, united at the base. Tail thick, cylindrical, about the length of head and body. Skin smooth, closely pitted; no parotoids; a vertical groove behind angle of jaws, crossed by a horizontal groove extending from posterior corner of eye to gular fold; latter strong; twelve costal grooves. Black; back with two series of yellow spots (red during life), which may unite and form regular chevrons; these spots sometimes very close together, separated by linear black interspaces resembling scutes.

	♂.	♀.	
Total length	176	205	millim.
From snout to cloaca	91	101	„
Head	17	17	„
Width of head	15	16	„
Fore limb	21	24	„
Hind limb	23	24	„
Tail	85	104	„

Mexico.

a. ♀.	Mexico.	Th. Bell, Esq. [P.]. (Type.)
b–c. ♀ & hgr.	Mexico.	
d–e. ♂ & hgr.	City of Mexico.	Mr. Doorman [C.].
f. ♂.	Putla.	M. Boucard [C.].
g. Yg.	Jalapa.	Mr. Hoege [C.].

12. Spelerpes fuscus.

Geotriton fuscus, *Gray, Cat.* p. 47.

Geotriton fuscus, *Bonap. Faun. Ital.*; *Gené, Syn. Rept. Sard.* p. 282; *Dum. & Bibr.* p. 112; *De Betta, Mem. Ist. Venet.* ii. p. 532; *Cope, Proc. Ac. Philad.* 1869, p. 102; *De Betta, Faun. Ital., Rett. Anf.* p. 84; *Wiedersh. Ann. Mus. Gen.* vii. p. 106.

Salamandra genei, *Schleg. Faun. Japon., Amph.* p. 115, *and Abbild.* p. 122, pl. 39. f. 5–7.

Geotriton genei, *Tschudi, Batr.* p. 94, pl. 5. f. 3.

Spelerpes fuscus, *Strauch, Salam.* p. 83; *Schreib. Herp. Eur.* p. 66.

Palatine teeth in two slightly arched series, extending externally beyond choanæ, separated from parasphenoid teeth; latter in two patches close together anteriorly, diverging posteriorly. Head moderate, longer than broad; snout truncate, with distinct canthus rostralis and very oblique loreal regions; a more or less marked swelling below each nostril, remnant of the cirrhus apparently common to the young of all the species of this genus; in the young the nostril is enormously large, as in the genus *Thorius*; eye rather large, prominent. Body short for the genus, measuring only about twice and a half the distance from tip of snout to gular fold. Limbs moderate, meeting when laid against the body; fingers and toes short, the tips very obtuse, almost truncate, half webbed; no carpal or tarsal tubercles. Tail cylindrical, shorter than head and body.

Skin smooth, porous; no parotoids; a strong gular fold; a groove from the eye to the latter; ten or eleven costal grooves. Brown or olive above, frequently with indistinct lighter markings; light brown beneath, uniform or speckled with dark.

	♂.	♀.	
Total length	96	84	millim.
From snout to cloaca	54	46	„
Head	12	10	„
Width of head	9	8	„
Fore limb	16	14	„
Hind limb	18	15	„
Tail	42	38	„

Italy; France, Alpes Maritimes.

a–b. ♀ & hgr.	Italy.	J. J. Bianconi [P.].
c–e. ♂, hgr., & yg.	Spezia.	Marquis G. Doria [P.].

13. Spelerpes morio.

Oedipus morio, *Cope, Proc. Ac. Philad.* 1869, p. 103.

Dentition as in *S. fuscus*. Head rather small, longer than broad; snout slightly truncate, without canthus rostralis; eye moderate. Body elongate, measuring about three times the distance from tip of snout to gular fold. Limbs rather weak, not meeting when adpressed; fingers and toes very short and broad, truncate, webbed, the tips free. Tail cylindrical, about the length of head and body. Skin smooth, porous; no parotoids; a strong gular fold; twelve or thirteen costal grooves. Black, with indistinct whitish dots.

Total length	97	millim.
From snout to cloaca	50	„
Head	$9\frac{1}{2}$	„
Width of head	$7\frac{1}{2}$	„
Fore limb	12	„
Hind limb	13	„
Tail	47	„

Mexico; Guatemala.

a–c. ♀, hgr., & yg.	Jalapa, Mexico.	Mr. Hoege [C.].

14. Spelerpes adspersus.

Spelerpes (Oedipus) adspersus, *Peters, Mon. Berl. Ac.* 1863, p. 468; *Strauch, Salam.* p. 84.
Oedipus adspersus, *Cope, Proc. Ac. Philad.* 1869, p. 103.

Palatine teeth forming a short, very open chevron, not extending externally beyond choanæ, separated from parasphenoid teeth; latter forming a pyramid-shaped patch, notched posteriorly. Head as in *S. fuscus*. Body measuring about three times the distance from tip

of snout to gular fold. Limbs weak, not meeting when adpressed; fingers and toes very short and broad, truncate, webbed, the tips free; no carpal or tarsal tubercles. Tail cylindrical, shorter than head and body. Skin smooth; no parotoids; gular fold strong; twelve costal grooves. Black or dark brown, with pale specks which may form series on the back.

Dimensions given by Peters:—

Total length	79	millim.
From snout to claoca	42	„
Head	9	„
Width of head	7	„
Fore limb	10	„
Hind limb	10½	„
Tail	37	„

Colombia.

a–b. Adult, not good state. Bogotá. Prof. Peters [P.].

15. Spelerpes rufescens.

Oedipus rufescens, *Cope, Proc. Ac. Philad.* 1869, p. 104.
Spelerpes (Oedipus) lignicolor, *Peters, Mon. Berl. Ac.* 1873, p. 617.

Dentition as in *S. adspersus*. Head small, longer than broad; snout truncate, without canthus rostralis; eye moderate. Body short, measuring not quite three times the distance from tip of snout to gular fold. Limbs weak, not meeting when adpressed; fingers and toes entirely united; no carpal or tarsal tubercles. Tail cylindrical, shorter than head and body. Skin smooth; no parotoids; a distinct gular fold; twelve costal grooves. Brown, white-speckled beneath; a triangular darker marking on the nape.

Total length	52	millim.
From snout to cloaca	30	„
Head	7	„
Width of head	5	„
Fore limb	7½	„
Hind limb	9	„
Tail	22	„

Mexico, Vera Cruz; Chiriqui.

a. Hgr. —?

16. Spelerpes altamazonicus.

Oedipus altamazonicus, *Cope, Proc. Ac. Philad.* 1874, p. 120.

Palatine teeth in two short arches meeting in the middle, not extending outwards beyond choanæ, separated from the parasphenoid teeth; latter forming a single patch anteriorly. Head an elongate oval; end of snout tumid, notched in the middle. Body elongate.

Limbs weak; digits palmate to the tips. Tail long, swollen at the base, a vertical oval in section. Skin smooth, porous; thirteen costal grooves. Uniform dark brown.

Total length	82	millim.
Head and body	40	„
Head	7	„
Width of head	5	„
Fore limb	7	„

Nauta, Upper Amazon.

17. Spelerpes yucatanicus.

Palatine teeth in two slightly arched series meeting in the middle, not extending outwards beyond the choanæ, separated from the parasphenoid teeth; latter in a single, pyramidal patch. Head small, depressed, longer than broad; snout rounded, without canthus rostralis; eye moderately large. Body rather depressed, elongate, measuring thrice and a half the distance from snout to gular fold. Limbs weak; fingers entirely united. Tail thick, cylindrical, as long as head and body. Skin smooth, porous; gular fold distinct; twelve costal grooves. Blackish brown; upper surfaces sprinkled with grey, lichen-like; lower surfaces with grey specks, some of which are confluent into short longitudinal lines.

Total length	107	millim.
From snout to cloaca	56	„
Head	10	„
Width of head	$7\frac{1}{2}$	„
Fore limb	12	„
Hind limb	13	„
Tail	51	„

Yucatan.

a. ♂. Yucatan.

18. Spelerpes infuscatus.

Spelerpes (Oedipus) infuscatus, *Peters, Mon. Berl. Ac.* 1879, p. 778.

Palatine teeth series extending outwards beyond the choanæ, separated from parasphenoid teeth; latter in a single patch. Body elongate; length of head and body equals seven times the width of the head. Limbs weak; digits entirely webbed. Gular folds distinct; thirteen costal grooves. Brown, sides blackish.

Total length (tail injured)	43	millim.
From snout to cloaca	21	„
Head	$4\frac{1}{2}$	„
Width of head	3	„
Fore limb	4	„
Hind limb	4	„

Hayti.

19. Spelerpes variegatus.

Oedipus variegatus, *Gray, Cat.* p. 48.
? Oedipus platydactylus (*Cuv.*), *Tschudi, Batr.* p. 93.
Salamandra variegata, *Gray in Griff. A. K.* ix. p. 107.
Bolitoglossa mexicana, part., *Dum. & Bibr.* pl. 104. fig. 1.
Geotriton carbonarius, *Cope, Proc. Ac. Philad.* 1860, p. 373.
Oedipus salvinii, *Gray, Ann. & Mag. N. H.* (4) ii. p. 297.
—— carbonarius, *Cope, Proc. Ac. Philad.* 1869, p. 103.
Spelerpes variegatus, *Strauch, Salam.* p. 84.
—— salvinii, *Strauch, l.c.*
—— sp., *Müller, Verh. naturf. Ges. Basel*, vi. p. 645, pl. 3. figs. C, D.

Series of palatine teeth extending outwards beyond the choanæ, separated from the parasphenoid teeth; latter forming a single patch, with or without a distinct notch posteriorly. Head small, longer than broad, depressed; snout rounded, slightly truncated; eyes moderately large. Body elongate, measuring thrice and a half to thrice and two thirds the distance from tip of snout to gular fold. Limbs weak; digits very short, entirely united; no carpal or tarsal tubercles. Tail cylindrical, generally longer than head and body. Skin smooth, shining, porous; no parotoids; a distinct gular fold; twelve or thirteen costal grooves. Black; back and head generally yellow (red?), or with yellow spots or bands.

	♂.	♀.	
Total length	175	184	millim.
From snout to cloaca	84	88	„
Head	14	15	„
Width of head	12	13	„
Fore limb	20	19	„
Hind limb	20	20	„
Tail	91	96	„

Central America.

The specimens may be referred to the following varieties of coloration:—

A. Blackish brown, with two longitudinal yellow bands.

a. ♂, bleached.	Mexico.	(Type.)

B. Blackish brown; head, back, and upper surface of tail yellow, with or without a few small black spots.

b. ♂.	Mexico.	(Type.)
c. ♀.	Mexico.	
d–f. ♀ & hgr.	Mexico.	M. Sallé [C.].
g–h. ♂? & hgr.	Cordilleras.	
i. ♀.	City of Mexico.	Mr. Doorman [C.].
k. ♀.	Orizaba.	
l. Yg.	Jalapa.	Mr. Hoege [C.].

C. Blackish brown; head, back, and upper surface of tail yellow, with large irregular black spots, with a very narrow white margin.

m. ♂.	Guatemala.	O. Salvin, Esq. [C.]. (Type of *Oedipus salvinii*.)
n. ♀.	Guatemala.	O. Salvin, Esq. [C.].

D. Blackish brown, with few irregular yellow spots on head, back, and base of tail.

o. ♀. Pacific coast of Guatemala. O. Salvin, Esq. [C.].

E. Blackish brown; head vermiculated with yellow; upper surface of back and tail with scute-like yellow spots, as in some specimens of *S. bellii*; limbs, sides, and lower surfaces closely speckled with grey.

p. ♂. Mexico. M. Sallé [C.].

20. Spelerpes parvipes.

Spelerpes (Oedipus) parvipes, *Peters, Mon. Berl. Ac.* 1879, p. 778.

Series of palatine teeth extending outwards beyond the choanæ, separated from the parasphenoid teeth; latter forming a single patch. Body much elongate; head and body measuring eleven times the width of the head. Limbs very weak; fingers and toes little developed, united. Tail longer than head and body. Gular fold distinct; seventeen costal grooves. Black; upper surface of head chiefly white; gular fold white; belly and sides of tail blotched with white; arm, elbow, and base of thigh with a white spot.

Total length	100	millim.
From snout to cloaca	44	„
Head	7	„
Width of head	4	„
Fore limb	6	„
Hind limb	9	„
Tail	56	„

Colombia.

21. Spelerpes lineolus.

Speerpes lineolus, *Cope, Proc. Ac. Philad.* 1865, p. 197; *Strauch, Salam.* p. 83.
Opheobatrachus lineolus, *Cope, eod. loc.* 1869, p. 101.

Palatine teeth forming a chevron, extending outwards slightly beyond the choanæ, separated from parasphenoid teeth; latter in two patches, confluent anteriorly, diverging posteriorly. Habit worm-like. Head very small, longer than broad; snout rounded, without canthus rostralis; eyes rather large. Body much elongate, cylindrical, measuring four and a half to five times the distance from tip of snout to gular fold. Limbs extremely weak; digits rudimental. Tail at least twice as long as head and body, cylindrical, as thick as the body in a considerable portion of its extent. Skin smooth, shining; no parotoids; a distinct gular fold; thirteen or fourteen costal grooves. Uniform black.

Total length	121	millim.
From snout to cloaca	36	„
Head	5	„
Width of head	3½	„
Fore limb	3½	„
Hind limb	3½	„
Tail	85	„

Mexico.

a. Adult.	Orizaba.	
b–c. Adult.	Mexico.	M. Sallé [C.].

22. Spelerpes uniformis.

Oedipina uniformis, *Keferst. Arch. f. Naturg.* 1868, p. 299.
Ophiobatrachus vermicularis, *Gray, Ann. & Mag. N. H.* (4) ii. 1868, p. 298.
Opheobatrachus vermicularis, *Cope, Proc. Ac. Philad.* 1869, p. 102.
Spelerpes uniformis, *Strauch, Salam.* p. 84.

Differs from the preceding in the following characters:—Parasphenoid teeth in a single patch. Habit more worm-like still. Tail as thick as the body in its whole extent, rounded at the end. Nineteen costal grooves.

Total length	178	millim.
From snout to cloaca	54	„
Head	6	„
Width of head	3½	„
Fore limb	4	„
Hind limb	4½	„
Tail	124	„

Costa Rica.

a. Adult.	Costa Rica.	O. Salvin, Esq. [C.]. (Type of *Ophiobatrachus vermicularis*.)

18. MANCULUS.

Batrachoseps, part., *Gray, Cat.* p. 42; *Strauch, Salam.* p. 84.
Manculus, *Cope, Proc. Ac. Philad.* 1869, p. 101.

Tongue supported by the glossohyal pedicel, boletoid, free all round. Palatine teeth in two short series, converging backwards; parasphenoid teeth in two elongate patches. Toes four.
North America.

1. Manculus quadridigitatus.

Batrachoseps quadridigitatus, *Gray, Cat.* p. 42.
Salamandra quadridigitata, *Holbr. N. Amer. Herp.* v. p. 65, pl. 21.
Batrachoseps quadridigitatus, *Baird, Journ. Ac. Philad.* (2) i. p. 287; *Strauch, Salam.* p. 85.
Manculus quadridigitatus, *Cope, Proc. Ac. Philad.* 1869, p. 101.

Palatine teeth in two very short series, converging posteriorly, touching the parasphenoid teeth; latter in two well-separated series, strongly diverging posteriorly. Head small, longer than broad; snout rounded, without canthus rostralis; eyes large. Body elongate, nearly four times the distance from tip of snout to gular fold. Limbs weak; fingers and toes rather slender, free. Tail longer than head and body, cylindrical, slightly compressed at the end. Skin smooth; no parotoids; gular fold strong, strongly arched, with the convexity forwards; fifteen costal grooves. Light brown; a dark brown lateral band commencing from the eye.

Total length	69	millim.
From snout to cloaca	28	„
Head	5	„
Width of head	3	„
Fore limb	5	„
Hind limb	7	„
Tail	41	„

North Carolina to Florida.

a. Adult. N. America. Prof. St. George Mivart [P.].

2. Manculus remifer.

Manculus remifer, *Cope, Report Peabody Acad. for* 1869, p. 84.

Differs from the preceding in the following characters:—Parasphenoid teeth well separated from palatines. Body shorter. Tail shorter, about the length of head and body, compressed, with a low fin in its distal half. Colour black above, and dark brown below; lower part of the sides of the head, body, and basal third of tail with dusted fine white dots.

Total length	58	millim.
From snout to cloaca	30	„
Fore limb	$5\frac{2}{3}$	„
Hind limb	7	„

Florida.

Subfam. D. *DESMOGNATHINÆ.*

Plethodontidæ, part., *Gray, Cat. Batr. Grad.*
Desmognathidæ, *Cope, Journ. Ac. Philad.* (2) vi. 1866, *and Proc. Ac. Philad.* 1869.
Thoriidæ, *Cope, Proc. Ac. Philad.* 1869.
Salamandrida Lechriodonta, part., *Strauch, Rev. d. Salam., in Mém. Ac. St. Pétersb.* (7) xvi. no. 4.

Two genera:—

Tongue attached along the median line. 19. **Desmognathus**, p. 77.
Tongue boletoid, free all round; nostrils extremely large ..... 20. **Thorius**, p. 79.

19. DESMOGNATHUS.

Desmognathus, *Baird, Journ. Ac. Philad.* (2) i. p. 282; *Gray, Cat.* p. 40; *Cope, Proc. Ac. Philad.* 1869, p. 112; *Strauch, Salam.* p. 72.
Cylindrosoma, part., *Dum. & Bibr.* ix. p. 76.
Plethodon, part., *Dum. & Bibr.* p. 82; *Hallow. Journ. Ac. Philad.* (2) iii. p. 342.

Tongue free laterally and posteriorly. Palatine teeth forming a very open chevon directed posteriorly, occasionally missing; parasphenoid teeth in two elongate patches. Toes five.
North America.

Synopsis of the Species.

14 costal grooves; tail rounded; male with posterior half of mandible concave and edentulous	1. *ochrophœus*, p. 77.
13 or 14 costal grooves; tail compressed, keeled	2. *fuscus*, p. 77.
12 costal grooves; tail compressed, finned above; black above and below	3. *niger*, p. 79.

1. Desmognathus ochrophæus.

Desmognathus ochrophæa, *Cope, Proc. Ac. Philad.* 1859, p. 124, and 1869, p. 113.
—— haldemanni, *Strauch, Salam.* p. 74.

Palatine teeth very small and few when present, often wanting; their basal line on a ridge which is convex backwards, nearly continuous medially; parasphenoid teeth on two narrow plates well separated from each other, especially behind, and from palatine teeth. Male with posterior half of mandible concave and edentulous, this structure being much like that of the genus *Anaides*. Tongue an elongate oval, considerably free behind. Head oval, with rounded depressed snout; the commissure of the mouth slightly flexuous. Body rather elongate. Limbs rather weak, not meeting when laid against the body; fingers and toes moderate, free. Tail quite slender, rounded, only compressed at the tip, about as long as head and body. Skin smooth; gular fold distinct; a more or less distinct groove from latter to eye; fourteen costal grooves. Bright brownish yellow, darker in the male, fading to dirty white below; a dark lateral band from the eye to the end of the tail; belly immaculate. Total length 75 millim.
Alleghany Mountains, from New York to Georgia.

2. Desmognathus fuscus.

Desmognathus fuscus, *Gray, Cat.* p. 40.
Triturus fuscus, *Rafin. Annals of Nature*, 1820 (*fide Baird*).
Salamandra intermixta, *Green, Cont. Macl. Lyc.* i. p. 827.
—— picta, *Harlan, Journ. Ac. Philad.* v. p. 138.
—— quadrimaculata, *Holbr. N. Amer. Herp.* v. p. 49, pl. 13.

Desmognathus fuscus, *Baird, Journ. Ac. Philad.* (2) i. p. 285; *Cope, Proc. Ac. Philad.* 1869, p. 115; *Strauch, Salam.* p. 74.
Plethodon fuscum, *Dum. & Bibr.* p. 85, pl. 101. f. 3.

Palatine teeth frequently wanting; if present, forming a posteriorly convex series behind and not extending outwards beyond the choanæ; parasphenoid patches diverging posteriorly, widely separated from palatine teeth. Tongue rather large, oval, extensively free laterally and posteriorly. Head moderately large, longer than broad, gradually widening to temporal regions, depressed; snout rather elongate, rounded; eyes moderate, prominent. Body slightly depressed, measuring thrice to thrice and a half the distance from tip of snout to gular fold. Limbs short, not meeting when laid against the body; fingers and toes rather slender, free. Tail measuring about the length of head and body, subcylindrical at the base, becoming gradually compressed and strongly keeled, ending in a point. Skin smooth or minutely granulate; a tubercle in anterior angle of upper eyelid; parotoid region and sides of throat swollen; a strong gular fold; a groove from the eye to the latter; a vertical groove at angle of jaws; thirteen or fourteen costal grooves. Above brown, with grey and pink shades; sometimes a dark lateral band; lower surfaces more or less mottled with brown; no red spots on sides.

	♂.	♀.	
Total length	125	95	millim.
From snout to cloaca	63	44	„
Head	14	9	„
Width of head	11	7½	„
Fore limb	14	9	„
Hind limb	18	13	„
Tail	62	51	„

Eastern United States.

a, b–c. ♂ & hgr.	New York.	
d. Several spec.: ♂ & hgr.	Near Philadelphia.	
e. Many spec.: ♂, ♀, hgr., yg., & larvæ.	N. America.	Dr. J. Green [P.].
f–h. ♂.	N. America.	Prof. St. George Mivart [P.].

Var. **auriculatus.**

Desmognathus auriculatus, *Gray, Cat.* p. 41.
Salamandra auriculata, *Holbr. N. Amer. Herp.* v. p. 47, pl. 12.
Desmognathus auriculatus, *Baird, Journ. Ac. Philad.* (2) i. p. 286; *Strauch, Salam.* p. 74.
Cylindrosoma auriculatum, *Dum. & Bibr.* p. 81.
Desmognathus fusca, var. auriculata, *Cope, Pr. Ac. Phil.* 1869, p. 116.

Body more slender. Dark brown, with a lateral series of small red spots; belly brown marbled, the dark predominating.
South Carolina to Lousiana.

i–l. ♂ ♀.	New Orleans.	Edw. Doubleday, Esq. [P.].
m. ♂.	N. America.	Prof. St. George Mivart [P.].

3. Desmognathus niger.

Desmognathus niger, *Gray, Cat.* p. 40.
Salamandra nigra, *Green, Journ. Ac. Philad.* i. p. 352.
Triton niger, *Holbr. N. Amer. Herp.* v. p. 81, pl. 27.
Desmognathus niger, *Baird, Journ. Ac. Philad.* (2) i. p. 286; *Cope, Proc. Ac. Philad.* 1869, p. 117; *Strauch, Salam.* p. 73.
Ambystoma nigrum, *Dum. & Bibr.* p. 105.
Plethodon niger, *Hallow. Journ. Ac. Philad.* (2) iii. p. 344.

Differs from the preceding in the following characters:—Series of palatine teeth generally better distinguished, separate; parasphenoid patches approaching very near the palatine teeth in most instances, generally confluent anteriorly. Tongue nearly round. Body stouter. Tail more compressed and extensively finned. Twelve costal grooves. Colour uniform black. Size larger (nearly 180 millim. from tip of snout to end of tail).

Alleghany Mountains, from Pennsylvania southward.

20. THORIUS.

Thorius, *Cope, Amer. Nat.* 1869, p. 222, *and Proc. Ac. Philad.* 1869, p. 111.

Tongue supported by its central pedicel, free all round, boletoid. Palatine teeth in a short transverse series; parasphenoid teeth in a single patch. Nostrils extremely large. Toes five.

Mexico.

1. Thorius pennatulus. (PLATE III. fig. 2.)

Thorius pennatulus, *Cope, ll. cc.*

Head small, longer than broad; snout truncate; loreal regions high, nearly vertical; nostril elliptical, oblique, extremely large. Body cylindrical, elongate, nearly four times the distance from tip of snout to gular fold. Limbs weak; digits rudimentary. Tail stout, cylindrical at the base, slightly compressed distally, about as long as head and body. Skin smooth; no parotoids; a distinct gular fold; thirteen costal grooves. Brown; a dark lateral band, whitish-margined above, commencing from the eye; lower surfaces uniform or dotted with whitish.

Total length	48	millim.
From snout to cloaca	25	„
Head	5	„
Width of head	3½	„
Fore limb	4	„
Hind limb	5	„
Tail	23	„

Mexico.

a–c. Adult. Orizaba.
d–h. Adult. —— ?

Fam. 2. AMPHIUMIDÆ.

Amphiumidæ, *Gray, Ann. Phil.* 1825.
Tritonides, *Tschudi, Classif. d. Batr.*
Proteideæ, part., *Tschudi, l. c.*
Protonopsidæ, Amphiumidæ, *Gray, Cat. Batr. Grad.*
Atrétodères, part., Trématodères Amphiumides, *Dum. & Bibr. Erp. Gén.* ix.
Amphiumidæ, Protonopsidæ, *Cope, Journ. Ac. Philad.* (2) vi. 1866.
Ichthyodea, part., *Strauch, Rev. d. Salam.*

Synopsis of the Genera.

Digits 4—5; no spiraculum..... 1. **Megalobatrachus**, p. 80.

Digits 4—5; spiraculum present.... 2. **Cryptobranchus**, p. 81.

Digits 3—3 or 2—2; spiraculum present. 3. **Amphiuma**, p. 82.

1. MEGALOBATRACHUS.

Megalobatrachus, *Tschudi, Batr.* p. 96.
Cryptobranchus, part., *Van der Hoeven, Proc. Zool. Soc.* 1838, p. 25.
Sieboldia, *Bonap. Faun. Ital.*; *Gray, Cat.* p. 52.
Tritomegas, *Dum. & Bibr.* ix. p. 163.

Tongue covering the floor of the mouth, entirely adherent. A strong series of vomerine teeth between the choanæ, parallel with and close to the intermaxillary and maxillary teeth. No spiraculum or gill-openings. Two branchial arches. Digits 4—5.
Japan; China.

1. Megalobatrachus maximus.

Sieboldia maxima, *Gray, Cat.* p. 52.
Salamandra maxima, *Schleg. Faun. Japon.* p. 127, pls. 6–8.
Megalobatrachus sieboldii, *Tschudi, l. c.*
Cryptobranchus japonicus, *Van der Hoeven, l. c., and Tijdschr. v. Nat. Gesch. en Physiol.* iv. p. 375, pl. v. A. f. 5, 6; *Hyrtl, Monogr.* 1865.
Sieboldia maxima, *Bonap. l. c.*
Tritomegas sieboldii, *Dum. & Bibr.* p. 164.
Sieboldia davidiana, *Blanchard, C. R. Ac. Paris*, 1871, lxxiii. p. 79; *Gray, Ann. & Mag. N. H.* (4) xii. p. 188.

Habit very stout. Head large, broad, much depressed; snout rounded; nostrils very small, at the end of the snout, near the labial border; eyes extremely small. Body squat, depressed. Limbs short, stout; fingers and toes short, depressed; outer fingers and toes and fibula bordered with membranes. Tail short, strongly compressed,

finned, the end rounded. Skin very porous, tubercular, tubercles largest and most prominent on the head; a thick cutaneous fold along each side. Brown, lighter beneath, spotted with black.

Total length	87	centim.
From snout to cloaca	53	„
Head (to constriction of neck)	13	„
Width of head	14	„
Fore limb	12	„
Hind limb	12	„
Tail	34	„

Japan; China.

a. Adult, stuffed.	Japan.	Leyden Museum.
b. Skeleton of *a*.	Japan.	Leyden Museum.
c-d. Adult & hgr.	Japan.	'Challenger' Expedition.
e. Skeleton.	Japan.	
f. Hgr.	China.	R. Swinhoe [C.].

2. CRYPTOBRANCHUS.

Cryptobranchus, *Leuckart, Isis*, 1821, p. 260.
Abranchus, *Harlan, Ann. Lyc. N. Y.* i. p. 221.
Menopoma, *Harlan, eod. loc.* p. 270; *Tschudi, Batr.* p. 96; *Dum. & Bibr.* ix. p. 205.
Salamandrops, *Wagl. Syst. Amph.* p. 209.
Eurycea, *Rafin. Atlant. Journ.* 1832, p. 121 (*fide Baird*).
Protonopsis (*Bart.*), *Gray, Cat.* p. 53.

Tongue covering the floor of the mouth, anterior border free. A strong series of vomerine teeth between the choanæ, parallel with and close to the intermaxillary and maxillary teeth. Spiraculum or gill-opening present (at least on the left side). Four branchial arches. Digits 4—5.

North America.

1. Cryptobranchus alleghaniensis.

Protonopsis horrida, *Gray, Cat.* p. 53.
Salamandra alleghaniensis, *Daud. Rept.* viii. p. 231.
—— gigantea, *Barton, On* Siren lacertina.
Molge gigantea, *Merr. Tent.* p. 187.
Cryptobranchus salamandroides, *Leuckart, l. c.*
Abranchus alleghaniensis, *Harlan, l. c.*
Menopoma alleghaniensis, *Harlan, l. c.*; *Holbr. N. Amer. Herp.* v. p. 95, pl. 32; *Dekay, N. Y. Faun., Rept.* p. 89, pl. 18. f. 44; *Dum. & Bibr.* p. 207, pl. 94. f. 1; *Wied, Nova Acta Leop.-Carol.* xxxii. p. 133, pl. 6.
Salamandrops gigantea, *Wagl. l. c.*
Eurycea mucronata, *Rafin. l. c.*
Menopoma gigantea, *Tschudi, l. c.*
Cryptobranchus alleghaniensis, *Van der Hoeven, Tijdschr. v. Nat. Gesch. en Physiol.* iv. p. 384, pl. v. A, f. 3-4, & v. B.

Habit very stout, exactly as in the preceding species. Head large, broad, much depressed; snout rounded; nostrils very small,

close to the labial border; eyes extremely small. Body squat, depressed. Limbs short, stout; fingers and toes short, depressed; outer fingers and toes and limbs externally bordered with much developed membranes. Tail short, strongly compressed, finned, the end rounded. Skin very porous, smoothish; head with scattered tubercles; sides of body with a well-marked thick cutaneous fold. Brown or greyish, with darker blotches; tips of fingers and toes yellowish.

Total length	418	millim.
From snout to cloaca	280	„
Head	44	„
Width of head	50	„
Fore limb	42	„
Hind limb	49	„
Tail	138	„

All tributaries of the Mississippi, and streams of the Louisianian district to North Carolina.

a, b. Hgr. Ohio.
c–d. Adult. Pennsylvania.
(In one of the specimens the right spiraculum has disappeared, as in the advanced larvæ of most tailless Batrachians.)
e, f. Adult & hgr. N. America.

Menopoma fuscum, Holbr. *l. c.* p. 99, pl. 33, is probably only a variety of this species. Reddish brown above, whitish beneath, immaculate. Head-waters of the Tennessee River.

3. AMPHIUMA.

Amphiuma, *Garden, in Smith's Correspondence of Linnæus*, i. p. 599; *Wagl. Syst. Amph.* p. 209; *Tschudi, Batr.* p. 67; *Gray, Cat.* p. 55; *Dum. & Bibr.* ix. p. 201.
Chrysodonta, *Mitchill, Medical Recorder*, 1822, p. 529.
Sirenoides, *Fitzing. Syst. Rept.* p. 34.
Murænopsis, *Fitzing. l. c.*; *Gray, l. c.*

Tongue indistinct, covering the floor of the mouth, entirely adherent. A strong series of vomerine teeth, parallel with the intermaxillary and maxillary teeth. Spiracula present. Four branchial arches. Limbs rudimentary; digits two or three.
North America.

1. Amphiuma tridactyla.

Murænopsis tridactyla, *Gray, Cat.* p. 55.
Amphiuma tridactyla, *Cuv. Mém. Mus.* xiv. p. 7, pl. 1. f. 4–6; *Holbr. N. Amer. Herp.* v. p. 93, pl. 31; *Tschudi, Batr.* p. 97; *Dum. & Bibr.* p. 203; *Ryder, Proc. Ac. Philad.* 1879, p. 14.
Murænopsis tridactyla, *Fitzing. Syst. Rept.* p. 34.

Body much elongate, eel-like. Head small; snout elongate, sub-

acuminate; nostrils small, close to the tip of the snout, near the labial border; eyes very small; upper and lower labial lobes much developed. Limbs extremely small; digits 3—3. Tail short, compressed, keeled above. Skin smooth, slimy. Uniform blackish brown, somewhat lighter beneath.

Total length	755	millim.
From snout to cloaca	575	„
Head	40	„
Width of head	31	„
Fore limb	13	„
Hind limb	21	„
Tail	180	„

Mississippi and Louisiana.

a. Adult.	Louisiana.	
b. Hgr.	Florida.	Dr. B. Harlan [P.].
c. Adult.	Mexico (?).	
d. Young.	—— ?	

2. Amphiuma means.

Amphiuma means, *Gray, Cat.* p. 55.
Amphiuma means, *Garden, l. c.*; *Holbr. N. Amer. Herp.* v. p. 89, pl. 30; *Dum. & Bibr.* p. 203.
Chrysodonta larvæformis, *Mitch. l. c.*
Amphiuma means s. didactyla, *Cuv. Mém. Mus.* xiv. p. 4, pl. 1. f. 1–3.
—— didactyla, *Wagl. Syst. Amph.* p. 209.
Sirenoides didactylum, *Fitz. l. c.*

Digits 2—2. Otherwise as in the preceding.
S.E. United States, from North Carolina to Mississippi.

a–c. Hgr. & yg.	N. America.	T. Bell, Esq. [P.].

Fam. 3. PROTEIDÆ.

Sirenidæ, part., *Gray, Ann. Phil.* 1825.
Proteideæ, part., *Tschudi, Classif. d. Batr.*
Proteidæ, *Gray, Cat. Batr. Grad.*
Trématodères protéides, part., *Dum. & Bibr. Erp. Gén.* ix.
Proteidæ, *Cope, Journ. Ac. Philad.* (2) vi. 1866.
Ichthyodea, part., *Strauch, Rev. d. Salam.*

Two genera:—

Digits 4—4; eyes exposed ..... 1. **Necturus**, p. 83.
Digits 3—2; eyes hidden ..... 2. **Proteus**, p. 85.

1. NECTURUS.

Necturus, *Rafin. in de Blainv. Journ. Phys.* lxxxviii. (1819), p. 417; *Wagl. Syst. Amph.* p. 210; *Gray, Cat.* p. 66.

Phanerobranchus, part., *Leuckart, Isis*, 1821, p. 260.
Menobranchus, *Harlan, Ann. Lyc. N. Y.* i. 1825, p. 221; *Tschudi, Batr.* p. 97; *Dum. & Bibr.* ix. p. 183.
Phanerobranchus, *Fitzing. Neue Classif. Rept.* p. 68.

Tongue large, anterior border free. Vomero-palatine teeth in a strong series. Eyes exposed. Fingers and toes four.
North America.

1. Necturus maculatus.

Necturus maculosus, *Gray, Cat.* p. 66.
Necturus lateralis, *id. ibid.* p. 67.
Necturus maculatus, *Rafin. l. c.*; *Holbr. N. Amer. Herp.* v. p. 111, pl. 37.
Triton lateralis, *Say, in Long's Exped. Rocky Mount.* i. p. 5.
Phanerobranchus tetradactylus, *Leuckart, l. c.*
Menobranchus lateralis, *Harlan, l. c.*; *Tschudi, Batr.* p. 97; *Holbr. l. c.* p. 115, pl. 38; *Dekay, N.Y. Faun., Rept.* p. 87, pl. 18. f. 45; *Dum. & Bibr.* p. 183; *Wied, Nova Acta Leop.-Carol.* xxxii. p. 138, pl. 7. f. 1.
—— tetradactylus, *Harlan, Journ. Ac. Philad.* iv. p. 324; *Gray, Ann. Philos.* x. 1825, p. 216.
—— sayi, *Gray, l. c.*
Proteus maculatus, *Barnes, Amer. Journ.* xi. p. 268.
Menobranchus lacepedii, *Gray, in Griff. A. K.* ix. p. 108.
Phanerobranchus lacepedii, *Fitz. l. c.*
Necturus lateralis, *Wagl. l. c.*

Teeth strong. Snout narrowed; eyes small; upper and lower labial lobes much developed. Body thick, elongate. Limbs short, well developed; digits slightly depressed, obtuse, free. Tail short, strongly compressed, finned, the end rounded. Skin smooth; a well-marked vertebral groove; a very strongly marked gular fold. Brown, lighter beneath, with more or less distinct round blackish spots; sometimes a blackish lateral band.

Total length	323	millim.
From snout to cloaca	213	„
Head (to gular fold)	39	„
Width of head	40	„
Fore limb	38	„
Hind limb	42	„
Tail	110	„

East United States; Canada.

a–b, c–d. ♂ & yg.	Montreal.	
e. ♂.	Canada.	
f. Hgr.	Ohio.	
g. ♀.	N. America.	Dr. J. E. Gray [P.].
h, i, k. ♂ ♀.	N. America.	
l. Skeleton.	United States.	

2. PROTEUS.

Proteus, sp., *Laur. Syn. Rept.* p. 37.
Proteus, *Schreibers, Phil. Trans.* 1801, p. 241; *Gray, Cat.* p. 65; *Dum. & Bibr.* ix. p. 185.
Hypochton, *Merrem, Tent.* p. 188; *Wagl. Syst. Amph.* p. 210; *Tschudi, Batr.* p. 97.
Phanerobranchus, part., *Leuckart, Isis*, 1821, p. 260.

Tongue small, free in front. Vomero-palatine teeth in two feeble series. Eyes concealed under the skin. Fingers three, toes two. Carniola.

1. Proteus anguinus. (PLATE II. figs. 5–7.)

Proteus anguinus, *Gray, Cat.* p. 65.
Proteus anguinus, *Laur. l. c.* pl. 4. f. 3; *Schreib. l. c.*; *Daud. Rept.* viii. p. 266, pl. 49. f. 1; *Configl. & Rusconi, Monogr.*; *Cuv. in Humb. Obs. Zool.* i. p. 119, pl. 13; *Dum. & Bibr.* ix. p. 186, pl. 96. f. 2; *Cope, Journ. Ac. Philad.* (2) vi. 1866, p. 104; *Schreib. Herp. Eur.* p. 11.
Siren anguina, *Shaw, Zool.* iii. p. 608, pl. 139.
Hypochton laurentii, *Merr. Tent.* p. 188; *Fitzing. Sitz. Ak. Wien*, v. 1850, p. 301.
Phanerobranchus platyrhynchus, *Leuckart, l. c.*
Hypochton anguinus, *Tschudi, Batr.* p. 97.
—— schreibersii, *Fitz. l. c.* p. 299.
—— freyeri, *Fitz. l. c.*
—— haidingeri, *Fitz. l. c.* p. 300.
—— xanthostictus, *Fitz. l. c.* p. 301.
Proteus xanthostictus, *Cope, l. c.* p. 103.
—— schreibersii, *Cope, l. c.* p. 104.

Head elongate; snout long, narrowed, the tip truncate; mouth small; labial lobes much developed. Body slender, elongate; limbs very weak; fingers and toes obtuse, free. Tail short, strongly compressed, finned, the end rounded or obtusely pointed. Cloacal opening as in *Onychodactylus*. Skin smooth; a more or less distinct gular fold; twenty-six or twenty-seven costal grooves. Uniform flesh-coloured.

Total length	283	millim.
From snout to cloaca	193	„
Head (to middle of gular fold)	31	„
Width of head	18	„
Fore limb	24	„
Hind limb	20	„
Tail	90	„

Subterranean waters of the Alps of Carniola.

a. Adult.	Carniola.	Vienna Museum. (As typical of *H. laurentii*.)
b–c. Adult.	Carniola.	Vienna Museum. (As typical of *H. schreibersii*.)
d. Adult.	Carniola.	Vienna Museum. (As typical of *H. freyeri*.)

e–f, g, h. Adult.	Carniola.	
i–k. Hgr.	Carniola.	M. Drummond, Esq. [P.].
l. Adult.	Carniola.	B. Tyndall, Esq. [P.].
m–n. Adult & yg.	Magdalenengrotte.	
o. Hgr.	—— ?	Miss Bell [P.].
p. Skeleton, bad state.	—— ?	

Var. **carraræ.**

Hypochton carraræ, *Fitzing. l. c.* p. 300.
Proteus carraræ, *Cope, l. c.* p. 103.

Snout more elongate, very narrow; twenty-four costal grooves.
Dalmatia.

q. Adult.	—— ?	Prof. Carrara [P.].

Var. **zoisii.**

Hypochton zoisii, *Fitzing. l. c.* p. 298.
Proteus zoisii, *Cope, l. c.*

Stouter; head much shorter, pear-shaped, snout rounded; twenty-five costal grooves.
Rupa, Carinthia.

r. Adult.	Carniola.	Vienna Museum. (As typical of *H. zoisii.*)

Fam. 4. SIRENIDÆ.

Sirenidæ, part., *Gray, Ann. Phil.* 1825.
Proteideæ, part., *Tschudi, Classif. d. Batr.*
Sirenidæ, *Gray, Cat. Batr. Grad.*
Trématodères protéides, part., *Dum. & Bibr. Erp. Gén.* ix.
Sirenidæ, *Cope, Journ. Ac. Philad.* (2) vi. 1866.
Ichthyodea, part., *Strauch, Rev. d. Salam.*

Two genera:—

Three spiracula on each side; digits four.
1. **Siren**, p. 86.
One spiraculum on each side; digits three.
2. **Pseudobranchus**, p. 87.

1. SIREN.

Siren, *Linn. S. N.* i. *Addenda*; *Tschudi, Batr.* p. 98; *Gray, Cat.* p. 68; *Dum. & Bibr.* ix. p. 191.
Phanerobranchus, part., *Leuckart, Isis*, 1821, p. 260.

Tongue covering the floor of the mouth, free in front. Jaws with a horny sheath. Vomerine teeth numerous, forming two large patches converging anteriorly. Spiracula three on each side, below the gills. Limbs two, posterior absent; fingers four.
North America.

1. Siren lacertina.

Siren lacertina, *Gray, Cat.* p. 68.
Siren intermedia, *id. ibid.* p. 69.
Siren lacertina, *Linn. l. c.*; *Cuv. in Humb. Obs. Zool.* i. p. 28, pl. 11–14; *Daud. Rept.* viii. p. 272, pl. 49. f. 2; *Holbr. N. Amer. Herp.* v. p. 101, pl. 34; *Tschudi, l. c.*; *Dum. & Bibr.* p. 193 (part.).
Phanerobranchus dipus, *Leuckart, l. c.*
Siren intermedia, *Leconte, Ann. Lyc. N.Y.* 1828, p. 133, pl. 1; *Holbr. l. c.* p. 107, pl. 35.

Body elongate, eel-like. Head rather small: snout short, broad; nostrils in the upper lip; eyes very small; labial lobes much developed. Limbs short; fingers well developed, pointed. Tail shorter than body, strongly compressed, finned, ending in a point. Skin smooth. Blackish, uniform or with small white dots.

Total length	670	millim.
From snout to cloaca	460	„
Head (to spiracle)	52	„
Width of head	35	„
Limb	38	„
Tail	210	„

S.E. United States.

a. Adult.	N. America.	Dr. Garden [P.].
b. Adult.	N. America.	Lord Ampthill [P.].
c–e. Young.	S. Carolina.	Zool. Soc.
f. Hgr.	Texas.	
g. Young.	—— ?	

2. PSEUDOBRANCHUS.

Pseudobranchus, *Gray, Ann. Phil.* 1825, p. 216, *and Cat.* p. 69.

Tongue covering the floor of the mouth, free in front. Jaws with a horny sheath. Vomerine teeth numerous, forming two large patches converging anteriorly. Spiraculum single on each side, below the gills. Limbs two, posterior absent; fingers three.
North America.

1. Pseudobranchus striatus *.

Pseudobranchus striatus, *Gray, Cat.* p. 69.
Siren striata, *Leconte, Ann. Lyc. N. Y.* 1824, p. 52, pl. 4; *Tschudi, Batr.* p. 98; *Holbr. N. Amer. Herp.* v. p. 109, pl. 36; *Dum. & Bibr.* pl. 96. f. 1.
Pseudobranchus striatus, *Gray, Ann. Phil.* 1825, p. 216.

Body elongate, eel-like. Head rather small; snout short, narrowed; eyes small; labial lobes much developed. Limbs very short; fingers well developed, pointed. Tail shorter than body, compressed, finned,

* Described from two specimens in the Paris Museum.

ending in a point. Skin granulate above. Dark brown, with a broad yellow band on each side, and a narrower one below.

Total length	180	millim.
From snout to cloaca	106	„
Head (to spiraculum)	11	„
Width of head	$4\frac{1}{2}$	„
Limb	$4\frac{1}{2}$	„
Tail	74	„

Georgia.

Order III. APODA.

No limbs; tail rudimentary. Males with an intromittent copulatory organ. Adapted for burrowing.

Fam. 1. CŒCILIIDÆ.

Cœciliadæ, *Gray, Ann. Phil.* 1825.
Cœciliæ, *Tschudi, Classif. d. Batr.*
Ophiosomes ou Céciloides, *Dum. & Bibr. Erp. Gén.* viii.
Cœciliidæ, *Gray, Cat. Batr. Grad.*

The classification recently proposed by Prof. Peters is adopted here, as being based on more scientific characters than that which was generally used before. It is to be regretted that the characters taken from the structure of the tentacle are rather difficult of application.

Synopsis of the Genera.

I. Cycloid imbricated scales imbedded in the skin, at least on the borders of the circular folds.

A. Eyes distinct or concealed under the skin.

Tentacle conical, exsertile, surrounded by a ring-shaped groove, situated between the nostril and the eye, near the lip.
1. **Ichthyophis**, p. 89.

Tentacle as in the preceding, but situated below the nostril.
2. **Uræotyphlus**, p. 91.

Tentacle flap-like, the tentacular groove horseshoe-shaped, situated below the nostril ..... 3. **Cœcilia**, p. 93.

Tentacle as in the preceding, but situated posteriorly to the nostril.
4. **Hypogeophis**, p. 96.

Tentacle globular, surrounded by a ring-shaped groove, situated below and in front of the eye .... 5. **Dermophis**, p. 97.

B. Eyes below the cranial bones.

Tentacle globular, surrounded by a ring-shaped groove, nearer the commissure of the jaws than the nostril.
6. **Gymnopis**, p. 99.

Tentacle as in the preceding, but nearer the nostril than the commissure of the jaws ..... 7. **Herpele**, p. 100.

II. No scales.

A. Squamosals in contact with parietals.

Eyes below the cranial bones; tentacle globular, surrounded by a ring-shaped groove ..... 8. **Gegenophis**, p. 101.

Eyes distinct; tentacle flap-shaped, tentacular groove horseshoe-shaped, much nearer the eye than the nostril.
9. **Siphonops**, p. 101.

Eyes distinct; tentacle as in the preceding, but nearer the nostril than the eye; end of body compressed.
10. **Typhlonectes**, p. 102.

B. Squamosals separated from parietals.

Tentacle flap-shaped, in the middle between the nostril and the eye.
11. **Chthonerpeton**, p. 104.

1. ICHTHYOPHIS.

Ichthyophis, *Fitzing. Neue Classif. d. Rept.* p. 36; *Gray, Cat.* p. 60; *Peters, Mon. Berl. Ac.* 1879, p. 931.
Epicrium, *Wagl. Isis*, 1828, p. 743, *and Syst. Amph.* p. 198; *Tschudi, Batr.* p. 90; *Dum. & Bibr.* viii. p. 285; *A. Dum. Mém. Soc. Cherb.* ix. p. 319.
Rhinatrema, *Dum. & Bibr.* p. 288; *Gray, l. c.*; *A. Dum. l. c.* p. 320.

Squamosals in contact with parietals. Two series of teeth in the lower jaw. Tentacles cultriform, exsertile, between the eye and the nostril. Cycloid scales imbedded in the skin.
East Indies.

1. **Ichthyophis glutinosus.** (PLATE IV. fig. 2.)

Ichthyophis glutinosus, *Gray, Cat.* p. 60.
Rhinatrema bivittatum, *id. ibid.* p. 61.
Cœcilia glutinosa, *Linn. Mus. Ad. Fred.* p. 19, pl. 25. f. 2, *and S. N.* i. p. 229; *Daud. Rept.* vii. p. 418; *Peters, Mon. Berl. Ac.* 1864, p. 303.
—— viscosa, *Latr. Rept.* iv. p. 238.
Ichthyophis hasseltii, *Fitzing. Neue Classif. Rept.* p. 63.
Cœcilia hypocyanea, *Hasselt, Isis*, 1827, p. 565; *Müller, Zeitschr. f. Phys.* iv. p. 195, *and Arch. Anat. Phys.* 1835, p. 391, pl. 8. f. 12–14; *Schleg. Abbild.* p. 119, pl. 39. f. 1.

Cœcilia bivittata, *Cuv. R. A.* 2nd ed., ii. p. 100.
Epicrium hypocyanea, *Wagl. Syst. Amph.* p. 198; *Tschudi, Batr.* p. 90.
—— glutinosum, *Dum. & Bibr.* p. 286; *Günth. Rept. Brit. Ind.* p. 441.
Rhinatrema bivittatum, *Dum. & Bibr.* p. 288, pl. 85. f. 4.
Ichthyophis glutinosus, *Peters, Mon. Berl. Ac.* 1879, p. 931, pl. —. f. 1–3.
—— beddomii, *Peters, l. c.* p. 932, pl. —. f. 4.

Both rows of mandibular teeth well developed. Snout rounded; the width of the head between the eyes equals the distance of the eye from the end of the snout; eye easily distinguishable; tentacle below and in front of the eye, generally much nearer the eye than the nostril. Body subcylindrical, rather depressed, moderately elongate, with very numerous (240 to 400) distinct circular folds, angular on the belly. Tail very short though distinct, pointed. Dark brown or bluish black; a yellow band along each side of the body, from the head to the tail. Total length 380 millim.; greatest diameter of body 14 millim.

In the larva the head is fish-like, greatly resembling that of *Amphiuma*, provided with much developed labial lobes; the tongue is extensively free in front, as in the larvæ of *Salamandridæ* and the *Perennibranchiata*. The tentacle-pit is either absent or close to the eye. The latter is much more developed than in the adult, about as much as in the *Amphiumidæ*. I cannot find any branchiæ. The spiracula are large. The tail is much more distinct than in the adult, strongly compressed, and finned above and beneath, the upper membrane extending somewhat in advance of the vent. The circular folds are very indistinct in the youngest specimens, become gradually more distinct as the animal grows. The anal opening is a longitudinal cleft.

East Indies.

a. Hgr.	Ceylon.	Sir J. Banks [P.].
b–f, g, h, i–k, l. Ad., hgr., & larva.	Ceylon.	
m. Adult.	Ceylon.	Sir J. E. Tennent [P].
n. Adult.	Wynaad.	
o. Several spec., ad. & hgr.	Nilgherries.	Col. Beddome [C.].
p–q. Hgr.	Darjeeling.	T. C. Jerdon, Esq. [C.].
r. Adult.	Khassya.	T. C. Jerdon, Esq. [C.].
s. Adult.	Khassya.	Sir J. Hooker [P.].
t–u. Hgr. & yg.	Tenasserim.	Dr. Cantor.
v. Adult.	Siam.	M. Mouhot [C.].
w–y. Hgr. & larvæ.	Matang.	
z. Adult.	——?	Royal College of Surgeons [P.].
a. Adult.	——?	— Samsbury, Esq.

The examination of a large series of specimens of this species collected by Col. Beddome in S.W. India shows that the characters upon which *I. beddomii* was established by Prof. Peters do not hold

good. I have seen all the possible transitions between the two extreme positions of the tentacle; the number of circular folds does not correspond with the position of the tentacle—one specimen with anterior tentacle having 270 folds, another, with the tentacle close to the eye, having 280.

2. Ichthyophis monochrous. (Plate IV. fig. 1.)

Ichthyophis glutinosus, var., *Cantor, Cat. Mal. Rept.* p. 137.
Epicrium monochroum, *Bleeker, Nat. Tydschr. Nederl. Ind.* xvi. 1858, p. 188; *Günth. Rep. Brit. Ind.* p. 443.
Ichthyophis monochrous, *Peters, Mon. Berl. Ac.* 1879, p. 932.

Differs from *I. glutinosus* in the following characters:—Head shorter, the distance between the eyes being more than the length of the snout. Inner series of mandibular teeth indistinct, composed of a few teeth only. 235 to 360 circular folds. Uniform blackish brown or lead-coloured, without lateral band. Total length 330 millim.; greatest diameter of body 13 millim.

Java, Borneo, Singapore, Malabar.

a. Adult.	Sinkawang, W. Borneo.	Dr. Bleeker.
b. Adult.	Java.	
c. Adult.	Singapore.	Dr. Cantor.
d. Adult.	Malabar.	Col. Beddome [C.].
e. Larva, large size.	Malabar.	Col. Beddome [C.].

2. URÆOTYPHLUS.

Cœcilia, sp., *Dum. & Bibr.* viii. p. 274; *Gray, Cat.* p. 57; *A. Dum. Mém. Soc. Cherb.* ix. p. 311.
Urœotyphlus, *Peters, Mon. Berl. Ac.* 1879, p. 933.

Squamosals free from parietals*. Teeth small, numerous in jaws and palate; two series in the lower jaw. Eyes visible. Tentacle cultriform, exsertile, below the nostril. Cycloid scales imbedded in the skin.

East Indies.

Synopsis of the Species.

Snout moderately prominent, its length equalling the distance between the eyes; about 200 circular folds	1. *oxyurus*, p. 92.
Snout very prominent, measuring more than the distance between the eyes; 240 to 260 circular folds	2. *malabaricus*, p. 92.
Snout moderately prominent, its length equalling the distance between the eyes; 130 circular folds	3. *africanus*, p. 92.

* *U. africanus* not examined.

1. Uræotyphlus oxyurus. (Plate V. fig. 2.)

Cœcilia oxyura, *Gray, Cat.* p. 58.
Cœcilia oxyura, *Dum. & Bibr.* p. 280; *A. Dum. l. c.* p. 22, pl. 1. f. 8; *Günth. Rept. Brit. Ind.* p. 443.
Uræotyphlus oxyurus, *Peters, l. c.* p. 933, *and Sitzb. Ges. nat. Fr.* 1881, p. 90.

Teeth small, subequal; both rows of mandibular teeth well developed. Snout narrowed, rounded; the width of the head between the eyes equals the distance of the eye from the tip of the snout; tentacle small, below the nostril, close to the lip; eyes easily distinguishable. Body cylindrical, moderately elongate, with numerous (200 to 210) distinct circular folds, widely interrupted on the belly (except those on the hindermost part of the body), alternately longer and shorter. Tail very short, though distinct, pointed. Blackish or purplish brown, lighter (sometimes white) beneath; lips and folds on the sides lighter. Total length 280 millim.; greatest diameter of body 13 millim.

Malabar.

a–b. Adult.	Anamallays.	Col. Beddome [C.].
c, d, e–f. Adult.	Malabar.	Col. Beddome [C.].
g–i. Yg., with spiracula.	Tinnevelly.	Col. Beddome [C.].
k–l. Adult & hgr.	——?	— Samsbury, Esq.

2. Uræotyphlus malabaricus. (Plate V. fig. 3.)

Cœcilia malabarica, *Beddome, Madras Monthl. Journ. Med. Sc.* ii. 1870, p. 176.
Uræotyphlus malabaricus, *Peters, l. c.* p. 933.

Well distinguished from the preceding by the following characters:—Snout more narrowed, more prominent, measuring more than the distance between the eyes. Plicæ more numerous (240 to 260), interrupted on the belly by a very narrow interspace. Dark olive-brown, a little lighter beneath; lips and end of snout yellowish. Total length 230 millim.; greatest diameter of body 8 millim.

Malabar.

a. Hgr.	Malabar.	Col. Beddome [C.]. (Type.)
b–f. Adult.	Malabar.	Col. Beddome [C.].

3. Uræotyphlus africanus. (Plate V. fig. 1.)

Teeth small, subequal; inner row of mandibular composed of a few teeth. Snout narrowed, rounded, moderately prominent; the width of the head between the eyes equals the distance of the eye from the tip of the snout; tentacle very distinct, below the nostril, close to the lip; eyes perfectly distinct. Body cylindrical, not much elongate; 90 circular folds, and shorter folds between each two of the last 40 (= 130 folds); these folds widely interrupted on the

belly except the last 15, which are complete; the anterior 50 narrowly interrupted on the dorsal region; a very distinct gular fold. Tail extremely short, hardly distinct, obtusely conical. Dark brown; the gular fold and the folds on the sides yellowish. Total length 165 millim.; greatest diameter of body 6 millim.

West Africa.

a. West Africa. J. C. Salmon, Esq. [P.].

3. CŒCILIA.

Cœcilia, part., *Linn. Syst. Nat.* i. p. 229.

Cœcilia, *Wagl. Syst. Amph.* p. 198; *Tschudi, Batr.* p. 90; *Dum. & Bibr.* viii. p. 274; *Gray, Cat.* p. 57; *A. Dum. Mém. Soc. Cherb.* ix. p. 311; *Peters, Mon. Berl. Ac.* 1879, p. 934.

Squamosals in contact with parietals. Two series of teeth in the lower jaw. Tentacle flap-shaped, tentacular groove horseshoe-shaped, situated below the nostril. Cycloid scales imbedded in the skin.

South America.

Synopsis of the Species.

I. The total length not 60 times the greatest diameter of the body.

135–150 circular folds, the majority interrupted on the dorsal and ventral lines; last 40–50 folds not interrupted on the dorsal line ..... 1. *tentaculata*, p. 93.

115–140 circular folds, the majority interrupted on the dorsal and ventral lines; last 16–20 folds not interrupted on the dorsal line ..... 2. *isthmica*, p. 94.

200 circular folds, complete above and below ..... 3. *ochrocephala*, p. 94.

II. The total length more than 60 times the greatest diameter of the body.

207 or 209 circular folds, nearly all complete above and below ..... 4. *polyzona*, p. 94.

160–170 circular folds, interrupted on the dorsal and ventral lines; teeth very large 5. *pachynema*, p. 95.

210–255 circular folds, interrupted on the dorsal and ventral lines ..... 6. *gracilis*, p. 95.

1. Cœcilia tentaculata.

Cœcilia tentaculata, *Gray, Cat.* p. 58.

Cœcilia tentaculata, part., *Linn. Mus. Ad. Fred.* p. 19.

—— tentaculata, *Shaw, Zool.* iii. p. 599, pl. 136; *Peters, Mon. Berl. Ac.* 1879, p. 934.

—— albiventris, *Daud. Rept.* vii. p. 423, pl. 92; *Dum. & Bibr.* p. 277.

Teeth moderately large; on each side—maxillaries 6 to 8, vomero-palatines 5, outer mandibulars 6 or 7; inner mandibulars very small, few. Snout rounded, prominent, shorter than the distance between the eyes; latter visible; tentacle below the nostril. Body cylindrical, elongate, robust; 135 to 150 circular grooves, interrupted on the dorsal and abdominal lines; the last 40 or 50 are not interrupted on the dorsal line, and the hindermost are complete. Tail indistinct, rounded. Blackish brown, marbled with white beneath. Total length 590 millim.; greatest diameter of body 20 millim.

Surinam.

a. Adult.	—— ?	Named by Dr. Shaw.
b. Hgr.	Surinam.	

2. Cœcilia isthmica. (Plate VI. fig. 1.)

Cœcilia rostrata, *Günth. Proc. Zool. Soc.* 1859, p. 417.
—— isthmica, *Cope, Proc. Amer. Philos. Soc.* 1877, p. 91.
—— güntheri, *Peters, Mon. Berl. Ac.* 1879, p. 936.
—— pachynema, *Bouleng. Bull. Soc. Zool. France*, 1880, p. 48.

Teeth moderately large; on each side—maxillaries 11, vomero-palatines 5, outer mandibulars 8; inner mandibulars very small, few. Snout truncate, very prominent, shorter than the distance between the eyes; latter visible; tentacle below the nostril, on the lower face of the snout. Body cylindrical, elongate, robust; 124 circular folds*, interrupted on the dorsal and abdominal lines, the last eighteen complete. Tail indistinct, rounded. Olive-brown, lighter beneath, uniform; lips whitish. Total length 660 millim.; greatest diameter of body 21 millim.

Isthmus of Darien; W. Ecuador.

a. Adult.	W. Ecuador.	Mr. Fraser [C.].

3. Cœcilia ochrocephala.

Cœcilia ochrocephala, *Cope, Proc. Ac. Philad.* 1866, p. 132.

Proportions near those of *Dermophis mexicanus*; length 51 times the diameter at middle. Head narrowed; snout decurved, not truncate, projecting acutely beyond mouth; eyes not visible; tentacle a little below the angle of the snout. Circular folds 200, equidistant, complete above and below. Tail obtuse, depressed. Yellowish plumbeous; the plicæ dark; throat and head ochre-yellow. Total length 325 millim.

Panama.

4. Cœcilia polyzona.

Cœcilia polyzona, *Fischer, Mon. Berl. Ac.* 1879, p. 937, *and Arch. f. Naturg.* 1880, p. 215, pl. 8. f. 1–4.

Maxillary teeth (on each side) 11 or 12, vomero-palatines 10 or 11,

* 142 in the type, 116 in a specimen in the Brussels Museum.

outer mandibulars 10, inner mandibulars 5 or 6. Snout prominent, pointed; eyes hidden; tentacle below the nostril, on the lower face of the snout. Body much elongate; 207 or 209 circular folds, complete, except a few which are interrupted on the belly; accessory folds between the ten hindermost, not meeting on the belly. Tail indistinct, rounded. Brownish grey, head and belly lighter; annuli marked with black. Total length 670 millim.; greatest diameter of body 11 millim.

Colombia.

5. Cœcilia pachynema. (Plate VI. fig. 2.)

Cœcilia pachynema, *Günth. Proc. Zool. Soc.* 1859, p. 417; *Peters, Mon. Berl. Ac.* 1879, p. 935.

Teeth large, few, widely separated; inner mandibulars very small, few; outer mandibulars very large, anterior longest, 5; maxillaries 6; vomero-palatines 9. Snout broad, rounded; eyes rather indistinct; tentacle below the nostril. Body cylindrical, very much elongate; 168 circular folds, widely interrupted on the dorsal and ventral regions. Tail indistinct, rounded. Olive, lighter beneath; a subquadrangular yellow spot between each two costal folds, forming a lateral band interrupted by vertical olive lines. Total length 930 millim.; greatest diameter of body 12 millim.

W. Ecuador.

a. Adult.	W. Ecuador.	Mr. Fraser [C.]. (Type.)

6. Cœcilia gracilis.

Cœcilia gracilis, *Gray, Cat.* p. 57.
Cœcilia tentaculata, part., *Linn. Mus. Ad. Fred.* pl. 5. f. 2.
—— gracilis, *Shaw, Zool.* iii. p. 597; *Günth. Proc. Zool. Soc.* 1859, p. 417; *Peters, Mon. Berl. Ac.* 1879, p. 937.
—— lumbricoidea, *Daud. Rept.* viii. p. 420, pl. 92; *Dum. & Bibr.* p. 275; *A. Dum. Mém. Soc. Cherb.* ix. p. 313.

Teeth rather large, 16 to 20 in the upper as well as in the lower jaw; palatine and inner mandibular teeth small, few; anterior mandibular tooth much the longest. Snout narrow, rounded, very prominent; eyes indistinct, exceptionally slightly visible; tentacle on the lower face of the snout, below the nostril. Body cylindrical, extremely elongate; 210 to 255 circular folds, interrupted on the dorsal and ventral regions, except the hindermost. Tail indistinct, rounded. Uniform brown or olive. Total length 700 millim.; greatest diameter of body 8 millim.: a very slender specimen (*e*) measures 650 and 5 millim.

Northern South America.

a–b. Adult.	Surinam.	Hr. Kappler [C.].
c. Adult.	Cayenne.	
d. Adult, bad state.	Demerara.	J. Hadfield, Esq. [P.].

e. Adult.	W. Ecuador.	Mr. Fraser [C.].
f. Adult.	Canelos, Ecuador.	Mr. Buckley [C.].
g. Adult, bad state.	—— ?	Named by Dr. Shaw.
h. Adult.	—— ?	Sir A. Smith [P.].
i. Several spec.	—— ?	
k. Adult.	—— ?	

4. HYPOGEOPHIS.

Cœcilia, sp., *Dum. & Bibr.* viii. p. 274; *Gray, Cat.* p. 57; *A. Dum. Mém. Soc. Cherb.* ix. p. 311.
Hypogeophis, *Peters, Mon. Berl. Ac.* 1879, p. 936.
Geotrypetes, *Peters, Sitzb. Ges. naturf. Fr.* 1880, p. 55.

Squamosals in contact with parietals. Two series of teeth in the lower jaw. Tentacle flap-shaped, tentacular groove horseshoe-shaped, situated below and behind the nostril. Cycloid scales imbedded in the skin.

Africa.

Synopsis of the Species.

Nearly all the circular folds completely surrounding the body ..... 1. *rostratus*, p. 96.
The anterior 40 folds interrupted on the dorsal and ventral lines ..... 2. *guentheri*, p. 96.
All the circular folds, except the hindermost, incompletely surrounding the body..... 3. *seraphini*, p. 97.

1. Hypogeophis rostratus. (Plate VII. fig. 2.)

Cœcilia rostrata, *Gray, Cat.* p. 58.
Cœcilia rostrata, *Cuv. R. A.*, 2e éd. ii. p. 100; *Dum. & Bibr.* p. 279; *Peters, Mon. Berl. Ac.* 1877, p. 456.
Hypogeophis rostratus, *Peters, Mon. Berl. Ac.* 1879, p. 936, *and Sitz. Ges. naturf. Fr.* 1880, p. 53.

Teeth small, subequal, few in inner mandibulary row. Head small; snout narrowed, acuminate, prominent, a little longer than the distance between the eyes; eyes visible; tentacle near the lip, much nearer the nostril than the eye. Body short, stout; about 125 circular folds, nearly all complete; a more or less distinct raised line along each side of the back; a median groove along the abdominal face. Tail indistinct, obtuse. Dark brown. Total length 280 millim.; greatest diameter of body 10 millim.

Seychelles.

a–b. Adult & hgr.	Seychelles.	Dr. E. P. Wright [C.].
c–g. Young, with spiracula.	Seychelles.	Dr. Günther [P.].
h. Adult.	—— ?	

2. Hypogeophis guentheri. (Plate VII. fig. 1.)

Teeth small, subequal, few in inner mandibulary row. Snout

narrowed, acuminate, prominent, its length slightly more than the distance between the eyes; latter rather indistinct; tentacle below and behind the nostril, much nearer the latter than the eye. Body short; 100 circular folds, the anterior 40 interrupted on the dorsal and ventral lines, the others complete. Tail indistinct, rounded. Uniform olive-brown. Total length 260 millim.; greatest diameter of body 11 millim.

Zanzibar.

a. Adult.	Zanzibar.	Capt. J. E. Parish, R.N. [P.].
b–g. Young, with spiracula.	Zanzibar.	Sir J. Kirk [C.].

3. Hypogeophis seraphini.

Cœcilia seraphini, *A. Dum. Arch. du Mus.* x. p. 222, *and Mém. Soc. Cherb.* ix. p. 314.
Hypogeophis seraphini, *Peters, Mon. Berl. Ac.* 1879, p. 937.
Geotrypetes seraphini, *Peters, Sitzb. Ges. naturf. Fr.* 1880, p. 55.

Teeth rather large, subequal, numerous in inner mandibulary row. Snout moderately prominent, rounded, slightly longer than the distance between the eyes; latter visible; tentacle near the lip, not far beyond the vertical of the nostril. Body moderately elongate; 120 circular folds, the hindermost only complete, those on the anterior two thirds of the body interrupted on the dorsal and ventral lines, the remainder interrupted inferiorly. Tail indistinct, obtusely conical. Dark brown, the folds yellowish. Total length 195 millim.; greatest diameter of body 6 millim. (Duméril gives 280 and 8 as the measurements of the adult.)

West Africa.

a. Hgr.	Lagos.

5. DERMOPHIS.

Siphonops, sp., *Dum. & Bibr.* viii. p. 281; *Gray, Cat.* p. 59; *A. Dum. Mém. Soc. Cherb.* ix. p. 317.
Dermophis, *Peters, Mon. Berl. Ac.* 1879, p. 937.

Squamosals in contact with parietals. Two series of teeth in the lower jaw. Tentacle globular, tentacular groove circular, situated in front of the eye. Cycloid scales imbedded in the skin.

Tropical America; West Africa.

Synopsis of the Species.

I. 150 to 170 circular folds, the secondary folds included.

Tentacle distinctly below the eye; belly lighter, annuli dark ..... 1. *mexicanus*, p. 98.
Tentacle scarcely below the eye; blackish, head white ..... 2. *albiceps*, p. 98.

II. 125 to 145 circular folds.

Circular folds on the median portion of the body alternately complete or incomplete	3. *thomensis*, p. 98.
Circular folds on the median portion of the body all incomplete	4. *brasiliensis*, p. 99.
Tentacle close to the eye	5. *proximus*, p. 99.

III. 228 circular folds, complete; tentacle close to the eye ..... 6. *simus*, p. 99.

1. Dermophis mexicanus. (Plate VIII. fig. 2.)

Siphonops mexicana, *Gray, Cat.* p. 59.
Siphonops mexicanus, *Dum. & Bibr.* p. 284; *A. Dum. l. c.* p. 23, pl. —. f. 10.
Dermophis mexicanus, *Peters, Mon. Berl. Ac.* 1879, p. 937, pl.— . f. 6.

Teeth small, subequal; inner mandibulary teeth few, indistinct. Snout rounded, moderately prominent, about as long as the distance between the eyes; latter distinct; tentacle below and in front of the eye, nearer the latter than the nostril. Body stout, moderately elongate; 150 to 170 circular folds, those on the anterior half and on the hindermost part of the body complete, the others alternately complete or interrupted on the belly. Tail indistinct, rounded. Greyish brown above, whitish beneath; the folds dark brown. Total length 425 millim.; greatest diameter of body 20 millim.

Central America.

a–b. Adult.	Mexico.	Capt. Sir Edw. Belcher [P.].
c. Adult.	Mexico.	C. Johnston, Esq. [P.].
d, e. Adult.	Pacific coast of Guatemala.	O. Salvin, Esq. [P.].
f. Adult.	Panama.	Capt. J. C. Dow [P.].
g. Hgr.	—— ?	Derby Museum [P.].

2. Dermophis albiceps. (Plate VIII. fig. 1.)

Teeth small, subequal. Snout rounded, moderately prominent, as long as the distance between the eyes; latter distinct; tentacle in front of, and slightly lower than, the eye. Body elongate; 170 circular folds, those on the anterior half and on the hindermost part of the body complete, the others alternately complete or interrupted on the belly. Tail indistinct, rounded. Blackish grey, the head white. Total length 210 millim.; greatest diameter of body 4½ millim.

Ecuador.

a. Hgr. ♀	Ecuador.	Mr. Buckley [C.].

3. Dermophis thomensis.

Siphonops thomensis, *Bocage, Jorn. Sc. Lisb.* xv. 1873, p. 224.
—— brevirostris, *Peters, Mon. Berl. Ac.* 1874, p. 617, pl. 1. f. 2.

Dermophis brevirostris, *Peters, eod. loc.* 1879, p. 937.
—— thomensis, *Peters, l. c.* p. 938, & 1880, p. 223.

Snout subacuminate, moderately prominent; eyes distinct; tentacle in front of and below the eye. Body moderately elongate; 125 to 145 circular folds, those on the anterior two thirds and on the hindermost part of the body complete, the others alternately complete or incomplete. Tail indistinct, rounded. Yellowish, brownish, or greyish. Total length 320 millim.; greatest diameter of body 15 millim.

West Africa.

4. Dermophis ? brasiliensis.

Siphonops brasiliensis, *Reinh. & Lütk. Vidensk. Meddel.* 1861, p. 202.
Dermophis ? brasiliensis, *Peters, Mon. Berl. Ac.* 1879, p. 938.

Tentacle near the eye, in front and below. Head narrow, elongate. 133 annuli, the 20 anterior and the 13 posterior complete, the others incomplete. Total length forty-six times the greatest diameter. Dark grey.

Brazil.

5. Dermophis ? proximus.

Siphonops proximus, *Cope, Proc. Amer. Philos. Soc.* xvii. 1877, p. 90.
Dermophis ? proximus, *Peters, l. c.*

Much resembling *D. mexicanus*, but the general form more elongate and slender, and the tentacle close to the eye, 129 annuli. Total length 425 millim.; diameter 17 millim.

Coast of Eastern Costa Rica.

6. Dermophis ? simus.

Siphonops simus, *Cope, l. c.* p. 91.
Dermophis ? simus, *Peters, l. c.*

Snout wide, truncate; tentacle close to the eye. Annuli complete, 228. Dark brown, below a little paler. Total length 308 millim.; diameter at middle 11 millim.

Costa Rica.

6. GYMNOPIS.

Rhinatrema, sp., *A. Dum. Mém. Soc. Cherb.* ix. p. 320.
Gymnopis, *Peters, Mon. Berl. Ac.* 1874, p. 216, & 1879, p. 938.

Squamosals in contact with parietals. Eyes overroofed by bone. Two series of teeth in the lower jaw. Tentacle globular, surrounded by a circular groove, situated considerably behind the nostril. Cycloid scales imbedded in the skin.

Tropical America.

Synopsis of the Species.

250 circular folds, complete or alternately complete and incomplete ..... 1. *multiplicata*, p. 100.
180 to 190 circular folds, complete ..... 2. *unicolor*, p. 100.
166 circular folds, mostly incomplete .... 3. *oligozona*, p. 100.

1. Gymnopis multiplicata.

Gymnopis multiplicata, *Peters, Mon. Berl. Ac.* 1874, p. 616, pl. 1. f. 1, & 1879, p. 939, pl. —. f. 7.

Teeth small, numerous, subequal. Snout rounded, prominent. Body moderately elongate; 250 circular folds, the anterior 20 and the posterior 31 complete, the others alternately complete and incomplete. Tail indistinct, rounded. Bluish grey; belly dark grey, passing into yellowish on the posterior part. Total length 500 millim.; diameter of body 19 millim.

Veragua and Antioquia.

2. Gymnopis unicolor.

Rhinatrema unicolor, *A. Dum. Mém. Soc. Cherb.* ix. p. 321, pl. 1. f. 6–8.

Gymnopis unicolor, *Peters, Mon. Berl. Ac.* 1879, p. 939.

Snout rounded, prominent. Body moderately elongate; 180 to 190 circular folds, complete. Tail indistinct, rounded. Olive; head and tail light greenish yellow. Total length 225 millim.; diameter of body 6 millim.

Cayenne.

3. Gymnopis ? oligozona.

Siphonops oligozonus, *Cope, Proc. Amer. Philos. Soc.* xvii. 1877, p. 91.

Gymnopis ? oligozona, *Peters, Mon. Berl. Ac.* 1879, p. 939.

Snout narrow, projecting. Body elongate; 166 annuli, anterior 14 and posterior 25 complete, 15th to 73rd incomplete, the others alternately complete and incomplete. Plumbeous brown; head yellowish. Total length 263 millim.; diameter 5 millim.

Hab. ——?

7. HERPELE.

Cœcilia, sp., *Gray, Cat.* p. 59; *A. Dum., Mém. Soc. Cherb.* ix. p. 311.
Herpele, *Peters, Mon. Berl. Ac.* 1879, p. 939.

Squamosals in contact with parietals; eyes overroofed by bone. Two series of teeth in the lower jaw. Tentacle globular, surrounded by a ring-like groove, situated below and posteriorly to the nostril. Cycloid scales imbedded in the skin.

West Africa.

1. Herpele squalostoma. (PLATE IX. fig. 1.)

Cœcilia squalostoma, *Gray, Cat.* p. 59.
Cœcilia squalostoma, *Stutchbury, Trans. Linn. Soc.* xvii. p. 362, *A. Dum. Arch. Mus.* x. p. 222, *and Mém. Soc. Cherb.* ix. p. 314.
Herpele squalostoma, *Peters, Mon. Berl. Ac.* 1879, p. 939, pl.—. f. 8.

Teeth small, numerous, subequal; inner mandibulary teeth few. Snout rounded, very prominent. Body elongate, cylindrical; 130 or 135 (140 to 150 according to Stutchbury and Duméril) annuli, all complete. Tail indistinct, rounded. Olive-brown, sometimes with yellow spots. Total length 450 millim.; greatest diameter of body 11 millim.

W. Africa.

a. Adult.	Gaboon.	
b. Adult.	——?	Dr. Wright [P.].

8. GEGENOPHIS.

Gegenes (*non Hübner*), *Günth. Proc. Zool. Soc.* 1875, p. 577.
Gegeneophis, *Peters, Mon. Berl. Ac.* 1879, p. 932.

Squamosals in contact with parietals. Two series of teeth in the lower jaw. Eyes overroofed by bone. Tentacle globular, surrounded by a circular groove, situated behind and below the nostril. No scales.

India.

1. Gegenophis carnosus. (PLATE VIII. fig. 3.)

Epicrium carnosum, *Beddome, Madras Month. Journ. Med. Sc.* 1870, p. 176.
Gegenes carnosus, *Günth. l. c.*

Teeth small, subequal. Snout narrowed, projecting; tentacle near the lip. Body elongate; 115 to 120 circular folds, all rather indistinct, interrupted on the back, the hindermost complete. Tail indistinct, rounded. Light brown; head yellowish. Total length 177 millim.; greatest diameter of body $3\frac{1}{2}$ millim.

Wynaad.

a–b. Hgr.?	Periah Peak.	Col. Beddome [C.]. (Types.)

9. SIPHONOPS.

Siphonops, *Wagler, Isis*, 1828, p. 740, *and Syst. Amph.* p. 198; *Tschudi, Batr.* p. 90; *Peters, Mon. Berl. Ac.* 1879, p. 940.
Siphonops, sp., *Dum. & Bibr.* viii. p. 282; *Gray, Cat.* p. 59; *A. Dum. Mém. Soc. Cherb.* ix. p. 317.

Squamosals in contact with parietals. A single series of teeth in the lower jaw. Tentacle flap-shaped, tentacular groove horseshoe-shaped, situated in front of the eye. No scales.

Tropical America.

1. Siphonops annulatus. (Plate VIII. fig. 4.)

Siphonops interrupta (*Cuv.*), *Gray, Cat.* p. 59.
Cœcilia annulata, *Mikan, Delect. Flor. Faun. Bras.*; *Spix, Serp. Bras.* p. 74, pl. 26. f. 1.
Siphonops annulatus, *Wagl. l. c.* pl. x. f. 1–2; *Dum. & Bibr.* p. 282, pl. 85. f. 1; *A. Dum. l. c.* pl. 1. f. 2; *Peters, l. c.*

Teeth small, numerous, subequal. Snout broad, rounded, moderately prominent, shorter than the distance between the eyes; latter distinct; tentacle in front of and below the eye. Body stout, cylindrical, moderately elongate; 85 to 95 circular folds, all complete, ceasing before the vent. Tail indistinct, rounded. Blackish or olive; annuli and borders of the vent whitish. Total length 390 millim.; greatest diameter of body 16 millim.

Guianas; Brazil; Ecuador; Peru.

a, *b*. Ad. & yg.	Bahia.	Dr. Wucherer [C.].
c. Hgr.	Bahia.	
d, *e*. Adult.	Rio Janeiro.	A. Fry, Esq. [P.].
f. Adult.	Brazil.	Lord Stuart [P.].
g. Hgr.	Brazil.	
h. Hgr.	Sarayacu, Ecuador.	Mr. Buckley [C.].
k. Adult.	Moyobamba.	Mr. A. H. Roff [C.].
l, *m*. Ad. & yg.	——?	Derby Museum [P.].
n. Adult.	——?	

10. TYPHLONECTES.

Cœcilia, sp., *Dum. & Bibr.* viii. p. 274; *Gray, Cat.* p. 57; *A. Dum. Mém. Soc. Cherb.* ix. p. 311.
Typhlonectes, *Peters, Mon. Berl. Ac.* 1879, p. 940.

Squamosals in contact with parietals. Two series of teeth in the lower jaw. Tentacle flap-shaped; tentacular groove horseshoe-shaped, situated behind the nostril. No scales. Body more or less compressed towards the end. Vent surrounded by a sort of adhesive disk.

South America.

Synopsis of the Species.

135 to 167 circular folds, interrupted on the back	1. *compressicauda*, p. 102.
99 circular folds, all complete; snout very prominent	2. *dorsalis*, p. 103.
Circular folds indistinct; snout very prominent	3. *natans*, p. 103.

1. Typhlonectes compressicauda.

Cœcilia compressicauda, *Gray, Cat.* p. 58.
Cœcilia compressicauda, *Dum. & Bibr.* p. 278; *Peters, Mon. Berl. Ac.* 1874, p. 45, & 1875, p. 483, pl. —.
Typhlonectes compressicaudus, *Peters, eod. loc.* 1879, p. 941, pl. —. f. 11.

Snout broad, rounded; eyes distinct; tentacle close to the nostril. Body stout, moderately elongate, becoming gradually compressed and keeled above towards the end; 135 to 167 circular folds, interrupted on the back. Tail indistinct. Olive-brown. Total length 470 millim.; diameter of body 20 millim.

Guianas; Venezuela.

2. Typhlonectes dorsalis.

Cœcilia dorsalis, *Peters, Mon. Berl. Ac.* 1877, p. 459, pl. —.
Typhlonectes dorsalis, *Peters, eod. loc.* 1879, p. 941.

Snout rounded, very prominent; eyes distinct; tentacle behind and below the nostril, twice as far from the eye as from the latter. Body rather slender, elongate; a raised line on the hinder part of the back, continued on the distinct, compressed, rudiment of tail; circular folds 99, all complete; anal disk very distinct. Yellowish brownish olive, the annuli black. Total length 265 millim.; diameter of body 7 millim.

Angostura, Venezuela.

3. Typhlonectes natans. (PLATE IX. fig. 3.)

Cœcilia natans, *Fischer, Mon. Berl. Ac.* 1879, p. 941, *and Arch. f. Nat.* 1880, p. 217, pl. viii. f. 5–7.
Typhlonectes natans, *Peters, Mon. Berl. Ac.* 1879, p. 941.

Inner row of mandibular teeth composed of 12 to 14 teeth. Snout very prominent; eyes distinct; tentacle behind and slightly below the nostril, three times nearer the latter than the eye. Body moderately elongate, strongly compressed posteriorly, with a more or less distinct prominent ridge on the posterior part of the back; skin granulate; circular folds very indistinct. Tail distinct. Brownish grey, a little lighter beneath; anal disk white. Total length 360 millim.; greatest diameter of body about 10 millim.

Cacera, Colombia.

a. Adult. Berlin Museum [E.].

The following species is referred, with doubt, by Prof. Peters to this genus; but nothing in Mr. Cope's description would seem to indicate the correctness of that view:—

SIPHONOPS SYNTREMUS, *Cope, Proc. Ac. Philad.* 1866, p. 129.

"This species differs from the four hitherto known (*S. indistinctus*, R. & L., *annulatus*, Mik., *brasiliensis*, Lütk., *mexicanus*, D. & B.) in the close approximation of the narial and tentacular openings; the latter lie behind the former, and are slightly larger. The minute eyes are just visible; the internal nares are some distance behind the palatine arch. Muzzle projecting, obtuse in profile; from above narrowed, rounded. Teeth large, five on each ramus mandibuli. A gular and strong postgular fold; 130 annular plicæ, which are complete, except slight ventral interruption ante-

riorly; the posterior third of the length with intermediate annuli, which are first lateral only, then complete above, entirely complete on the terminal inch: the whole number will then be about 170 annuli. Form of body rather slender; tail depressed at end, short, acuminate. Colour dark plumbeous, annuli yellow-lined; head yellowish brown."

Belize.

11. CHTHONERPETON.

Chthonerpeton, *Peters, Mon. Berl. Ac.* 1879, p. 940.

Squamosals separated from parietals. Two series of teeth in the lower jaw. Tentacle flap-shaped, the tentacular groove crescent-shaped, situated between the nostril and the eye. No scales.

South America.

1. Chthonerpeton indistinctum.

Siphonops indistinctus, *Reinh. & Lütk. Vidensk. Meddel.* 1861, p. 203; *A. Dum. Mém. Soc. Cherb.* ix. p. 318.

Chthonerpeton indistinctum, *Peters, Mon. Berl. Ac.* 1879, p. 940.

Teeth small, numerous, subequal. Snout rounded, prominent; eyes distinct; tentacle between the nostril and the eye, below the line which would unite them. Body moderately elongate; circular folds 78 to 100, rather indistinct, incomplete. Tail indistinct, rounded. Blackish grey, with or without irregular lighter spots. Total length 320 millim.; greatest diameter of body 12 millim.

Porto Alegre; Buenos Ayres.

2. Chthonerpeton petersii. (Plate IX. fig. 2.)

Teeth small, numerous, subequal. Snout rounded, moderately prominent; eyes not distinct through the skin; tentacle close to and behind the nostril. Body elongate; 145 circular folds, complete except the anterior 28, which are interrupted on the dorsal and ventral line. Tail indistinct, rounded. Uniform dark olive-grey, the eyes indicated by a whitish spot. Total length 620 millim.; greatest diameter of body 16 millim.

Upper Amazon.

a. Adult. Upper Amazon.

THE GEOGRAPHICAL DISTRIBUTION

OF THE

BATRACHIA.

Of the various primary Geographical Divisions which have been proposed, that recognized by Günther for Freshwater Fishes, into *Northern*, *Equatorial*, and *Southern* zones, agrees best with the facts deducible from a study of Batrachians. We have, however, to make one modification, as for Batrachians a separate Southern zone does not exist. Tasmania and Patagonia do not differ in any point regarding their Frog-fauna from Australia and South America respectively. In other words, the geographical distribution of the Batrachia agrees in general with that of Freshwater Fishes; whilst other groups of cold-blooded Vertebrata, the Lacertilia for instance, were subject to a totally different plan of dispersion, which is better expressed by the divisions proposed by Sclater.

In spite of the objections that have been made to the practice of specialists to define geographical regions from considerations derived from their own particular study, I still believe this to be the only successful way of dealing with the subject; and I consider that fallacious conclusions would be arrived at if a division of the Globe's surface made for Reptilia were applied, without modification, to Batrachians, or even to the several orders of the former Class.

The following are the principal divisions adopted:—

I. The Northern Zone.—Characterized by abundance of *Caudata* and absence of *Apoda*.

1. *Europo-Asiatic* or *Palæarctic Region*.—Numerous *Salamandrinæ*. Absence of *Hylidæ* with a single exception. *Discoglossidæ*.
2. *North-American Region*.—*Sirenidæ*; few *Salamandrinæ*; *Plethodontinæ*, *Amblystomatinæ*, and *Hylidæ* numerous; *Desmognathinæ*.

II. The Equatorial Southern Zone.—Characterized by *Apoda* or absence of *Caudata*.

A. *Firmisternia Division* (= *Cyprinoid Division* of Günther).—*Firmisternia* greatly predominate (260 species out of 300). Absence of *Hylidæ* and *Cystignathidæ*.

1. *Indian Region*.—No *Aglossa* or *Dendrobatidæ*.
2. *African Region*.—*Dactylethridæ* or *Dendrobatidæ*.

B. *Arcifera Division* (= *Acyprinoid Division* of Günther).—*Arcifera* greatly predominate (370 out of 420). *Hylidæ*, *Cystignathidæ*.

1. *Tropical American Region*.—*Apoda*, *Pipidæ*, *Hemiphractidæ*, *Amphignathodontidæ*, *Dendrophryniscidæ*, *Dendrobatidæ*. *Bufo* numerous.
2. *Australian Region*.—Absence of *Apoda* and *Bufo*.

1. The Europo-Asiatic or Palæarctic Region.

This region is limited in the south-west by the Sahara, all the species hitherto recorded from Morocco, Algiers, and Tunis being truly Palæarctic, and not less than four species of the order *Caudata* (which is altogether absent in the African Region) occurring in this part of North Africa. Northern Egypt presents an interesting mixture of Palæarctic and African forms; of the four *Ecaudata* known from that country, two (*Bufo viridis* and *Hyla arborea*) are widely distributed in the Europo-Asiatic, the two others (*Rana mascareniensis* and *Bufo regularis*) in the African Region; a species of Tailed Batrachian also occurs, but is known from the larva only *. Little is known of Arabia, but the northern parts appear to agree with Northern Egypt. Syria is decidedly Palæarctic, as is also North-eastern Persia, where the widely distributed *Rana esculenta*, *Bufo viridis*, *Hyla arborea*, and *Molge cristata* occur without the addition of any African or Indian form. Afghanistan appears to be Indian. In Southern China we meet with a gradual predominance of Indian types. Roughly speaking, the 30° lat. N. may be considered the line separating the Europo-Asiatic Region from the African and Indian.

The Europo-Asiatic Region is poorer than any other in the number of species; as regards genera it equals the North-American and Australian Regions.

The *Discoglossidæ* only, the least specialized of all the families of *Ecaudata*, can be regarded as peculiar to this region, although one representative occurs outside its boundaries, viz. the genus *Liopelma* of New Zealand, which thus affords a remarkable and perfectly analogous instance of the distribution of the Salmonoid genera *Osmerus* and *Retropinna*. The other families of *Ecaudata* are:—the *Ranidæ*, occurring in every other part of the World but Australia; the *Bufonidæ*, which are cosmopolitan; the *Hylidæ*, a widely distributed group, rich in species, represented in this Region by a single species; and the *Pelobatidæ*, a small group represented, besides, in the North-American and Indian Regions and in New Guinea. The *Caudata* are chiefly *Salamandridæ*, which family occurs wherever the Order is represented; one genus of the small families *Amphiumidæ* and *Proteidæ* are also represented by single species, the former reaching its greatest development in the North-American Region.

Two Subregions may be distinguished—the European and the Asiatic, the Oural and the Aralo-Caspian steppes forming the line of separation. Japan does not differ in any important character from Eastern Asia, and about half of its species (6 out of 13) occur also in China.

The European Subregion is characterized by *Pelobatidæ* and *Discoglossidæ*, and by the numerous *Salamandrinæ* and the genus *Proteus*; very curiously, a species of the otherwise entirely American genus

* M. F. Lataste has received several larvæ of a Salamandroid collected near Alexandria by M. Letourneux. It will probably turn out to be *Salam. maculosa*, which has recently been discovered in Syria, and which will accordingly be Circummediterranean.

Spelerpes occurs in Italy. The Asiatic Subregion is characterized by the presence of two outposts of the Indian genus *Rhacophorus*; no *Pelobatidæ* have as yet been found within its boundaries; and the *Discoglossidæ* are represented by the European *Bombinator igneus* only. The *Caudata* belong mostly to the *Amblystomatinæ*, the *Salamandrinæ* being represented by only 4 species (against 19 in the European Subregion), one of which is widely distributed in Europe. We must also notice the occurrence of *Megalobatrachus*, closely allied to the North-American *Cryptobranchus*.

The following table will show the proportions of the known genera and species in the two subregions. The European Subregion appears at present richer both as regards genera and species; but we may expect this fact to be reversed when the fauna of Central Asia is better known.

	European Subregion.	Asiatic Subregion.	Both Subregions.
ECAUDATA.			
FIRMISTERNIA.			
Ranidæ.			
Rana	4	5	2
Rhacophorus	..	2	
ARCIFERA.			
Bufonidæ.			
Bufo	2	1	2
Hylidæ.			
Hyla	..	..	1
Pelobatidæ.			
Pelobates*	2		
Pelodytes*	1		
Discoglossidæ			
Discoglossus*	1		
Bombinator*	..	..	1
Alytes*	2		
CAUDATA.			
Salamandridæ.			
Salamandrinæ.			
Salamandra*	3		
Chioglossa*	1		
Molge	14	2	1
Salamandrina*	1		
Pachytriton*	..	1	
Amblystomatinæ.			
Hynobius*	..	3	
Salamandrella*	..	2	
Onychodactylus*	..	1	
Ranidens*	..	1	
Batrachyperus*	..	1	
Plethodontinæ.			
Spelerpes	1		
Proteidæ.			
Proteus*	1		
Amphiumidæ.			
Megalobatrachus*	..	1	

Those groups marked with an asterisk (*) are peculiar to the Region.

Thus we have 9 genera and 34 species peculiar to the European, and 8 genera and 20 species to the Asiatic Subregion; whilst 5 genera and 7 species are spread over both.

It is also interesting to observe the gradual transition of the European *Caudata* into the North-American fauna, as is shown in the following table :—

	Number of Species in the		
	European Subregion.	Asiatic Subregion.	N.-American Region.
Salamandrinæ	20	4	2
Amblystomatinæ	..	8	17
Amphiumidæ.....	..	1	3

whilst, on the other hand, we must notice the presence of *Pelobatidæ* in Europe and North America, they being absent in the intermediate Asiatic Subregion; also the presence in Europe of a species of *Spelerpes*, a genus abundantly represented in North America and not in Asia; and, finally, the affinity which exists between the European *Proteus* and the North-American *Necturus*.

No species is known to be common to the Europo-Asiatic and North-American Regions, but some, such as *Rana temporaria*, *Bufo calamita*, &c., and their North-American representatives, are extremely closely related, and to be distinguished with difficulty only.

If we except the very widely distributed genera *Rana*, *Bufo*, and *Hyla*, we have only two genera which are common to both regions, viz. *Molge* and *Spelerpes*.

2. The North-American Region.

It is difficult to draw a boundary line between the North-American and the Tropical-American Regions; a large territory, extending from the Rio Grande del Norte to the Isthmus of Tehuantepec, has a North-American fauna in its elevated parts, whilst a tropical flourishes in its low country; besides, as in all intermediate districts, a gradual mixing of the two faunæ obtains. We adopt the boundary-line drawn by Wallace.

The North-American Region is particularly characterized by the great abundance of *Caudata*, viz. 55 species (that is, more than half of those actually known) occurring within its boundary. It has one family peculiar to it, the *Sirenidæ*. The Salamandroid subfamilies *Desmognathinæ* and *Plethodontinæ* are also characteristic of this region, although the latter has one representative occurring in Europe and a few in the Tropical-American Region. The family *Amphiumidæ* may also be considered characteristic of the North-American Region, as it possesses three out of four species and two out of three genera. The *Ecaudata* are chiefly *Rana* and *Hylidæ*: of *Bufo* there are relatively few species; the *Pelobatidæ* are represented by the genus *Scaphiopus*. In the South two outposts occur from the Tropical-American Region, viz. *Engystoma* and *Hylodes*, both represented by a single species.

The two Subregions into which this Region is frequently divided do not present the same marked distinctive features as the corresponding Subregions of the Eastern Hemisphere; but we may notice that the small groups *Sirenidæ*, *Proteidæ*, *Amphiumidæ*, and *Desmognathinæ* are restricted to the Eastern Subregion, whilst all other groups are distributed also in the Western. With one or two exceptions the species are different.

ECAUDATA.

FIRMISTERNIA.	Number of Species.
Ranidæ.	
Rana	15
Engystomatidæ.	
Engystoma	1
ARCIFERA.	
Cystignathidæ.	
Hylodes	1
Bufonidæ.	
Bufo	7
Hylidæ.	
Chorophilus	7
Acris *	1
Hyla	13
Pelobatidæ.	
Scaphiopus *	8

CAUDATA.

Salamandridæ.	
Salamandrinæ.	
Molge	2
Amblystomatinæ.	
Dicamptodon *	1
Amblystoma	16
Plethodontinæ.	
Anaides *	2
Plethodon *	6
Batrachoseps *	4
Spelerpes	12
Manculus *	2
*Desmognathinæ.**	
Desmognathus *	3
Thorius *	1
Amphiumidæ.	
Cryptobranchus*	1
Amphiuma *	2
Proteidæ.	
Necturus *	1
Sirenidæ *.	
Siren *	1
Pseudobranchus *	1

3. The African Region.

This Region, which comprises the whole of Africa (with the exception of the Northern part), Southern Arabia, Madagascar, the Seychelle and Mascarene Islands, is characterized by an almost entirely *Firmisternian* Frog-fauna, the *Arcifera* belonging to two genera only, viz. *Nectophryne*, which occurs in the Indian Region with three species and here with one, and the nearly cosmopolitan *Bufo*. This character is still more marked in the Madegasse Subregion, whose numerous Frogs are exclusively *Firmisternia*. A striking feature of the African continent is the development of an Aglossous family, *Dactylethridæ*. The *Caudata* are totally absent. The *Apoda* represented by few species, 3 in West Africa, 1 in East Africa, and 1 in the Seychelles; they have not been found either in South Africa or in Madagascar. These five species of *Apoda* belong to three genera, of which one is peculiar to the Region, the two others occurring also either in the Indian or Tropical-American Region, Of the 20 genera of *Ecaudata Firmisternia*, 17 are peculiar to Africa, amongst which *Rappia* deserves special notice, as representing the Indian *Ixalus*.

Two well-marked Subregions may be distinguished—the Continental and the Madegasse. The former is characterized by the *Dactylethridæ*, the presence of *Bufonidæ*, and the genera *Chiromantis*, *Phrynobatrachus*, *Cassina*, *Hylambates*, *Phrynomantis*, *Breviceps*, and probably *Hemisus* *. One Indian species, the widely distributed *Rana cyanophlyctis*, occurs in Arabia (*R. ehrenbergii*, Ptrs.); and the West-African *Rana occipitalis* is so closely allied to the Oriental *R. tigrina* that it is extremely difficult to distinguish them.

The Madegasse Subregion is of high interest, presenting an assemblage of African, Indian, and Tropical-American forms. The first, however, greatly predominate, whilst Indian types are represented by numerous species of *Rhacophorus* and one species of *Calophrynus*. We must also mention the small family *Dyscophidæ*, of which six species inhabit Madagascar and one the Indian Region. The genus *Mantella*, which is peculiar to Madagascar, forms with the closely allied South-American *Dendrobates* the family *Dendrobatidæ*. As mentioned already, we do not know yet one single representative of the *Arcifera*; therefore no two parts of the world are more different in their Batrachian fauna than Madagascar and Australia, the former being composed solely of *Firmisternia*, the latter solely of *Arcifera*. They, however, agree in some negative characters, being the only two parts of the world which entirely lack the genus *Bufo* and have neither *Caudata* nor *Apoda*.

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* It is doubtful whether Grandidier's *Hemisus obscurus* has been referred to the proper genus.

	Number of Species.		
	Continental Subregion.	Madegasse Subregion.	Both Subregions.
ECAUDATA.			
PHANEROGLOSSA.			
FIRMISTERNIA.			
Ranidæ.			
Rana	23	10	2
Rhacophorus	..	13	
Chiromantis*	3		
Phrynobatrachus*	3		
Arthroleptis*	7	1	
Rappia*	19	4	
Megalixalus*	6	1	
Cassina*	2		
Hylambates*	9		
Dendrobatidæ.			
Mantella*	..	4	
Engystomatidæ.			
Calophrynus	..	1	
Scaphiophryne*	..	1	
Phrynomantis	2		
Breviceps*	3		
Rhombophryne*	..	1	
Hemisus*	2	1?	
Dyscophidæ.			
Dyscophus*	..	2	
Plethodontohyla*	..	3	
Platypelis*	..	1	
Cophyla*	..	1	
ARCIFERA.			
Bufonidæ.			
Nectophryne	1		
Bufo	7		
AGLOSSA.			
Dactylethridæ.			
Xenopus*	3		
APODA.			
Cæciliidæ.			
Uræotyphlus	1		
Hypogeophis*	3		
Dermophis	1		

4. THE INDIAN REGION.

As previously observed, 30° N. lat. may be taken as the northern boundary of this Region, which is limited westwards by the Persian Gulf; its eastern boundaries are in the islands of the Molucca and Banda seas, where the fauna commences to pass into that of Australia. In its general character this Region bears a strong resemblance to Tropical Africa, whilst it is most distinct from Australia. It exceeds the African fauna as regards the number

of species (167 : 139), the number of genera being about the same (27 : 26). There is no family peculiar to it. The *Firmisternian* families *Ranidæ* and *Engystomatidæ* are represented by numerous genera and species, and the *Dyscophidæ* by one; the *Arcifera* by *Bufonidæ*, *Pelobatidæ*, and *Hylidæ*; the latter, however, occur in the northern parts only, in two species very closely related to the Europo-Asiatic *Hyla arborea*. Two forms of *Caudata* occur, viz. *Tylototriton*, in Yunnan and the Himalayas, and a species of the otherwise entirely North-American genus *Amblystoma*, which has been found in the mountains of Laos. These forms, however, cannot be considered to be characteristic of the Indian Region, but should be regarded as immigrants from the Northern Zone; and, in fact, they seem to be limited to such altitudes as compensate the difference of latitude. Another Europo-Asiatic immigrant in the northern parts is the widely distributed *Bufo viridis*. Five species of *Apoda* occur belonging to three genera, two of which are peculiar to the Region, the other being represented by a species in West Africa.

ECAUDATA.

FIRMISTERNIA.	Number of Species.
Ranidæ.	
Oxyglossus*	3
Rana	48
Rhacophorus	23
Ixalus*	27
Cornufer	2
Nyctibatrachus*	2
Nannobatrachus*	1
Nyctixalus*	1
Nannophrys*	2
Engystomatidæ.	
Melanobatrachus*	1
Calophrynus	2
Microhyla*	5
Callula*	7
Cacopus*	2
Glyphoglossus*	1
Dyscophidæ.	
Calluella*	1
ARCIFERA.	
Bufonidæ.	
Nectophryne	3
Bufo	22
Nectes*	1
Hylidæ.	
Hyla	2
Pelobatidæ.	
Leptobrachium*	2
Xenophrys*	1
Megalophrys*	2

CAUDATA.

Salamandridæ.	Number of Species.
Salamandrinæ.	
Tylototriton*	1
Amblystomatinæ.	
Amblystoma	1

APODA.

Cæciliidæ,	
Ichthyophis*	2
Uræotyphlus	2
Gegeneophis*	1

5. The Tropical-American Region.

The Tropical-American Region comprises the whole of South America, Central America to the limits of the North-American Region, and the West Indies. It exceeds every other Region with regard to the number of families, genera, and species, the total number of the latter being about four ninths of all those actually known.

The *Ecaudata* are represented by:—very numerous *Cystignathidæ* and *Hylidæ*, these two families alone equalling in number all the rest; numerous *Bufonidæ* and *Engystomatidæ*; few *Ranidæ*, a few of which only belong to the genus *Rana*; the *Dendrobatidæ*, the second genus of which inhabits Madagascar; the *Dendrophryniscidæ*, *Amphignathodontidæ*, and *Hemiphractidæ*, three small families confined to this region; and, finally, the *Pipidæ*, which, with the African *Dactylethridæ*, constitute the suborder *Aglossa*.

A small number of *Caudata*, belonging to the genus *Spelerpes*, inhabit Central America—two species, favoured by altitude, extending southwards to Colombia, and a third reaching a few degrees south of the equator. A species of the same genus has also been recently described from the West Indies. But the most extraordinary instance of geographical distribution, if it be confirmed, will be the presence in the valley of the Plate river of a species of *Plethodon* extremely closely allied to the Californian forms.

The *Apoda* are represented by 6 genera and 21 species. Out of these 6 genera, 5 are peculiar to the region; the other, curiously enough, it has in common with West Africa.

The striking character of this region is the great proportion (224 : 38) of *Arcifera*, and especially of *Cystignathidæ* and *Hylidæ*, it in this respect resembling the Australian region. Its affinities with the Indian and African regions are shown by the development of *Engystomatidæ*, and with the latter region particularly by the presence of *Aglossa*, *Dendrobatidæ*, and the Apodal genus *Dermophis*. As to its affinities with the North-American region, it is well known that one fauna passes gradually into the other; but if we compare the fauna of the United States with that of South America, the difference between them is as great as between those of any other two Regions, Africa and Australia excepted.

ECAUDATA.

PHANEROGLOSSA.

FIRMISTERNIA.

	Number of Species.
Ranidæ.	
Rana	5
Hylixalus*	2
Prostherapis*	2
Phyllodromus*	1
Colostethus*	1
Dendrobatidæ.	
Dendrobates*	7
Engystomatidæ.	
Rhinoderma*	1
Phryniscus*	11
Brachycephalus*	1
Stereocyclops*	1
Hypopachus*	2
Engystoma	4

ARCIFERA.

Cystignathidæ.	
Pseudis*	4
Centrolene*	1
Cyclorhamphus*	1
Calyptocephalus*	2
Telmatobius*	6
Elosia*	3
Phyllobates*	8
Hylodes	45
Ceratophrys*	11
Edalorhina*	2
Paludicola*	17
Leptodactylus*	19
Plectromantis*	2
Limnomedusa*	1
Hylorhina*	1
Borborocœtes*	11
Zachænus*	1
Dendrophryniscidæ.	
Batrachophrynus*	2
Dendrophryniscus*	1
Bufonidæ.	
Engystomops*	3
Bufo	36
Rhinophrynus*	1
Hylidæ.	
Thoropa*	1
Chorophilus	1
Hyla	87
Nototrema*	5
Hylella	4
Pternohyla*	1
Nyctimantis*	1
Agalychnis*	2

	Number of Species.
Phyllomedusa*	13
Triprion*	2
*Amphignathodontidæ**.	
Amphignathodon*	1
Grypiscus*	1
*Hemiphractidæ**.	
Hemiphractus*	2
Ceratohyla*	5
Amphodus*	1
AGLOSSA.	
*Pipidæ**.	
Pipa*	1
CAUDATA.	
Salamandridæ.	
Plethodontinæ.	
(Plethodon	?1)
Spelerpes	9
APODA.	
Cæciliidæ.	
Cœcilia*	6
Dermophis	6
Gymnopis*	3
Siphonops*	1
Typhlonectes*	3
Chthonerpeton*	2

6. The Australian Region.

Besides Australia, this Region comprises Tasmania, New Zealand, New Guinea, and the islands of the Pacific. Three well-marked Subregions may be distinguished:—1. the Austromalayan, comprising New Guinea and neighbouring islands, Cape York, and Polynesia; 2. the Australian, comprising the continent of Australia and Tasmania; and 3. New Zealand.

The general character of the Australian fauna is negative, and consists in the absence of *Apoda*, *Caudata*, *Bufo*, and *Rana* (except in the Austromalayan or transitional subregion). The fauna consists mainly of the two families *Cystignathidæ* and *Hylidæ*, which are likewise most developed in Tropical America.

The Austromalayan Subregion presents an interesting blending of the Indian and Australian faunæ. To the former must be reckoned 12 *Firmisternia*, belonging to 6 genera of the families *Ranidæ* and *Engystomatidæ*, and 3 *Pelobatidæ*, each of which is the type of a genus restricted to the subregion. Eleven *Hylidæ* (*Hyla* and *Hylella*) are Australian types. A curious fact is the occurrence (according to Peters) of a third species of the African genus *Phrynomantis* in Amboyna and Batanta. The small islands of the Pacific are inhabited by but few species, viz. a *Rana* and a *Hyla* in the Solomon Islands, and 3 *Cornuferi* in the Caroline and Fiji Islands;

a species of *Bufo*, closely related to American forms, occurs in the Sandwich Islands †. New Caledonia, which has lately been well investigated, has not yielded a single Batrachian.

The Frog-fauna of the Australian Subregion is composed of the families *Cystignathidæ*, *Bufonidæ*, and *Hylidæ*—the first being represented by seven genera, all of which are peculiar to the Subregion, the second by three genera, also peculiar to the Subregion, and the third by *Hyla* and by *Hylella*.

From the third, or New-Zealand Subregion, a single species is known, *Liopelma hochstetteri*, very curiously a member of the family *Discoglossidæ*, which is otherwise restricted to the Europo-Asiatic Region.

ECAUDATA.	Austro-Malayan Subregion.	Australian Subregion.	N.-Zealand Subregion.
FIRMISTERNIA.			
Ranidæ.			
Rana	3		
Cornufer	5		
Engystomatidæ.			
Sphenophryne*	1		
Xenobatrachus*	1		
Phrynomantis	1		
Xenorhina*	1		
ARCIFERA.			
Cystignathidæ.			
Mixophyes*	..	1	
Limnodynastes*	..	6	
Cryptotis*	..	1	
Crinia*	..	4	
Hyperolia*	..	1	
Chiroleptes*	..	6	
Heleioporus*	..	2	
Bufonidæ.			
Pseudophryne*	..	4	
(Bufo	1)		
Notaden*	..	1	
Myobatrachus*	..	1	
Hylidæ.			
Hyla	10	19	
Hylella	1	1	
Pelobatidæ.			
Lechriodus*‡	1		
Asterophrys*	1		
Ranaster*	1		
Discoglossidæ.			
Liopelma*	..	..	1

† This fact bears a strong analogy to the occurrence in the Sandwich Islands of a Siluroid (*Arius*) closely allied to a Central-American species.

‡ The name *Batrachopsis*, proposed by me for this genus, being preoccupied (Fitzinger, Syst. Rept.), is changed into *Lechriodus*.

With regard to the number of genera and species, the six regions would take the following order:—

1. The Tropical-American R.	58	genera,	48	peculiar to R.;	375	species.
2. The Indian R.	28	„	19	„	168	„
3. The African R.	26	„	19	„	141	„
4. The North-American R.	23	„	14	„	108	„
5. The Australian R.	23	„	17	„	75	„
6. The Europo-Asiatic R.	22	„	16	„	60	„

There exists great diversity with respect to the extent to which the several families have been dispersed over the globe, as may be seen from the following arrangement:—

1. Families represented in the 6 Regions.

Bufonidæ. Cosmopolitan, except Madagascar, New Guinea, and New Zealand.

Ranidæ. Most abundant in the Indian and African Regions, few in the Tropical-American Region, absent from the Australian and New-Zealand Subregions.

2. Families represented in 5 Regions.

Hylidæ. Very numerous in the Tropical-American Region; numerous in the Australian and North-American Regions; two species in the northernmost parts of the Indian, and one throughout the Europo-Asiatic Region.

Engystomatidæ. Nearly equally abundant in the Tropical-American, Indian, and African Regions; several forms in the Austro-Malayan Subregion, and one species in the Southern parts of North America.

3. Families represented in 4 Regions.

Pelobatidæ. Europo-Asiatic, North-American, and Indian Regions, and Austro-Malayan Subregion.

Salamandridæ. Very abundant in the North-American and Europo-Asiatic Regions; few in the Tropical-American Region; two species in the Northern parts of the Indian Region.

4. Families represented in 3 Regions.

Cœciliidæ. Tropical-American, African, and Indian Regions.

Cystignathidæ. Tropical-American Region and Australian Subregion; one species in the Southern parts of the North-American Region.

5. Families represented in 2 Regions.

Dendrobatidæ. Tropical-American Region and Madegasse Subregion.

Dyscophidæ. Madegasse Subregion and Indian Region.

Discoglossidæ. Europo-Asiatic Region and New Zealand.

Amphiumidæ. North-American Region and Asiatic Subregion.

Proteidæ. North-American Region and European Subregion.

6. Families restricted to 1 Region.

Dendrophryniscidæ. Tropical-American Region.
Amphignathodontidæ. Tropical-American Region.
Hemiphractidæ. Tropical-American Region.
Dactylethridæ. African Subregion.
Pipidæ. Tropical-American Region.
Sirenidæ. North-American Region.

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LIST OF PLATES.

Plate I.

Pachytriton brevipes, Sauvg., p. 30, with view of mouth and profile of head.

Plate II.

Fig. 1. *Hynobius peropus*, Blgr., p. 33.
1 *a*. —— ——, lower view.
1 *b*. —— ——, profile of head.
1 *c*. —— ——, open mouth, 1½ nat. size.
2. *Amblystoma jeffersonianum*, Green, p. 46, open mouth, 1½ nat. size.
3. *Amblystoma paroticum*, Baird, p. 48, open mouth, 1½ nat. size.
4. —— *microstomum*, Cope, p. 50, upper view of head, 1½ nat. size.
4 *a*. —— ——, profile of head, 1½ nat. size.
4 *b*. —— ——, open mouth, 1½ nat. size.
5. *Proteus anguinus*, Laur., p. 85, upper view of head.
6. —— ——, var. *carrarœ*, upper view of head.
7. —— ——, var. *zoisii*, upper view of head.

Plate III.

Fig. 1. *Batrachyperus sinensis*, Sauvg., p. 37.
1 *a*. —— ——, lower view.
1 *b*. —— ——, profile of head.
1 *c*. —— ——, open mouth, 1½ nat. size.
2. *Thorius pennatulus*, Cope, p. 79, profile of head, ×4 nat. size.

Plate IV.

Fig. 1. *Ichthyophis monochrous*, Blkr., p. 91, larva.
1 *a*. —— ——, profile of head.
1 *b*. —— ——. open mouth, × 2 nat. size.
1 *c*. —— ——, lower view of end of body and tail.
2. —— *glutinosus*, L., p. 89, upper view of head.
2 *a*. —— ——, profile of head.
2 *b*. —— ——, tentacle, front view, much enlarged.
2 *c*. —— ——, tentacle, lateral view, much enlarged.
2 *d*. —— ——, section of the belly.
2 *e*. —— -——, lower view of end of body.

Plate V.

Fig. 1. *Uræotyphlus africanus*, Blgr., p. 92.
1 *a*. —— ——, upper view of head, × 2 nat. size.
1 *b*. —— ——, profile of head, × 2 nat. size.
1 *c*. —— ——, tentacle, lateral view, much enlarged.
1 *d*. —— ——, tentacle, front view, much enlarged.
1 *e*. —— ——, lower view of end of body, × 2 nat. size.
2. —— *oxyurus*, D. & B., p. 92, upper view of head.
2 *a*. —— ——, profile of head.
3. —— *malabaricus*, Bedd., p. 92, upper view of head.
3 *a*. —— ——, profile of head.

Plate VI.

Fig. 1. *Cœcilia isthmica*, Cope, p. 94, profile of head and anterior part of body.
1 *a*. —— ——, upper view of head and anterior part of body.
1 *b*. —— ——, lower view of posterior part of body.
2. —— *pachynema*, Gthr., p. 95, profile of head and anterior part of body.
2 *a*. —— ——, tentacle, front view, much enlarged.
2 *b*. —— ——, upper view of head and anterior part of body.
2 *c*. —— ——, lower view of posterior part of body.

PLATE VII.

Fig. 1. *Hypogeophis guentheri*, Blgr., p. 96.
1 *a*. —— ——, profile of head, ×2 nat. size.
2. —— *rostratus*, Cuv., p. 96, profile of head, ×2 nat. size.

PLATE VIII.

Fig. 1. *Dermophis albiceps*, Blgr., p. 98.
1 *a*. —— ——, profile of head, ×2 nat. size.
2. —— *mexicanus*, D. & B., p. 98, profile of head.
3. *Gegenophis carnosus*, Bedd., p. 101.
3 *a*. —— ——, profile of head, ×2 nat. size.
3 *b*. —— ——, tentacle, front view, much enlarged.
3 *c*. —— ——, tentacle, lateral view, much enlarged.
4. *Siphonops annulatus*, Mik., p. 102, profile of head.

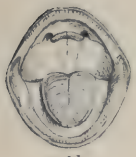
PLATE IX.

Fig. 1. *Herpele squalostoma*, Stutchb., p. 101, profile of head and anterior part of body.
1 *a*. —— ——, tentacle, front view, much enlarged.
1 *b*. —— ——, tentacle, lateral view, much enlarged.
1 *c*. —— ——, lower view of posterior part of body.
2. *Chthonerpeton petersii*, Blgr., p. 104, upper view of head and anterior part of body.
2 *a*. —— ——, profile of head and anterior part of body.
2 *b*. —— ——, lower view of posterior part of body.
3. *Typhlonectes natans*, Fisch., p. 103, profile of head and anterior part of body.
3 *a*. —— ——, lower view of posterior part of body.

R. Mintern del. et lith.

Mintern Bros. imp.

4.


4b.

4a.

1.

1b.

1c.

1a.

3.

2.

7.

5.

6.

R. Mintern del. et lith. Mintern Bros. imp.

1. Hynobius peropus. 2. Amblystoma jeffersonianum. 3. Amblystoma paroticum.
4. Amblystoma microstomum. 5. Proteus anguinus. 6. Proteus anguinus var. carrara.

R.Mintern del.et lith.

Mintern Bros

1. Batrachyperus sinensis. 2. Thorius pennatulus.

1a.

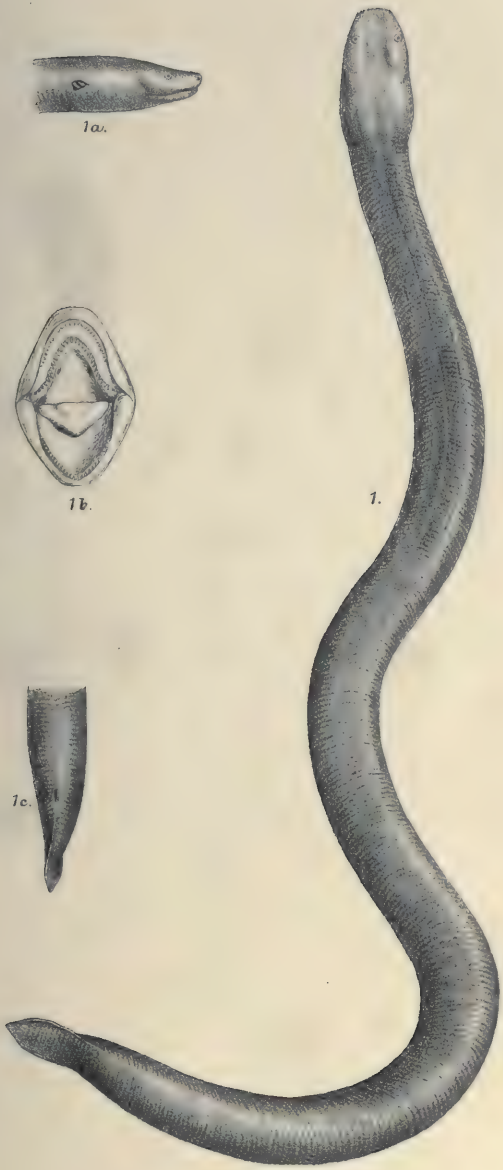
2a.

2b.

2c.

1b.

2.



1.

1c.

2d.

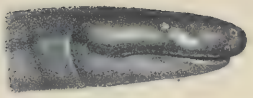
2e.

R. Mintern del. et lith.

Mintern Bros. i

1. Ichthyophis monochrous, larva. 2. Ichthyophis glutinosus.

1b.



2a.

1d.

1c.

3a.

1a.

1.

3.

1e.

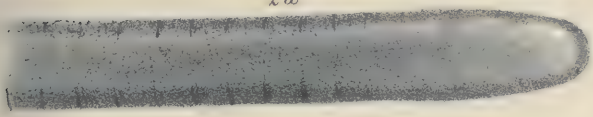
2.

R. Mintern, del. et lith. Mintern Bros imp

1. Uræotyphlus africanus. 2. Uræotyphlus oxyurus. 3. Uræotyphlus malabaricus.

2

2 a



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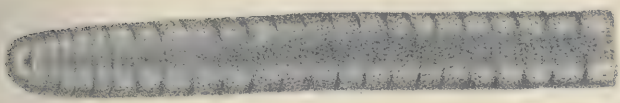

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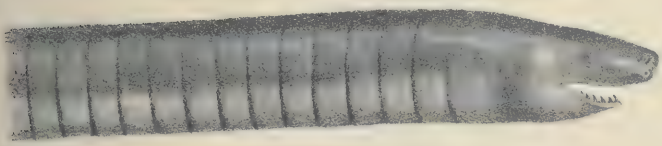

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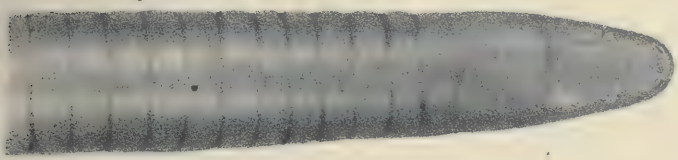

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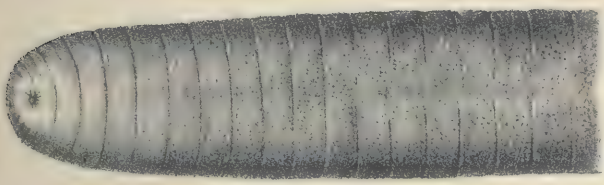
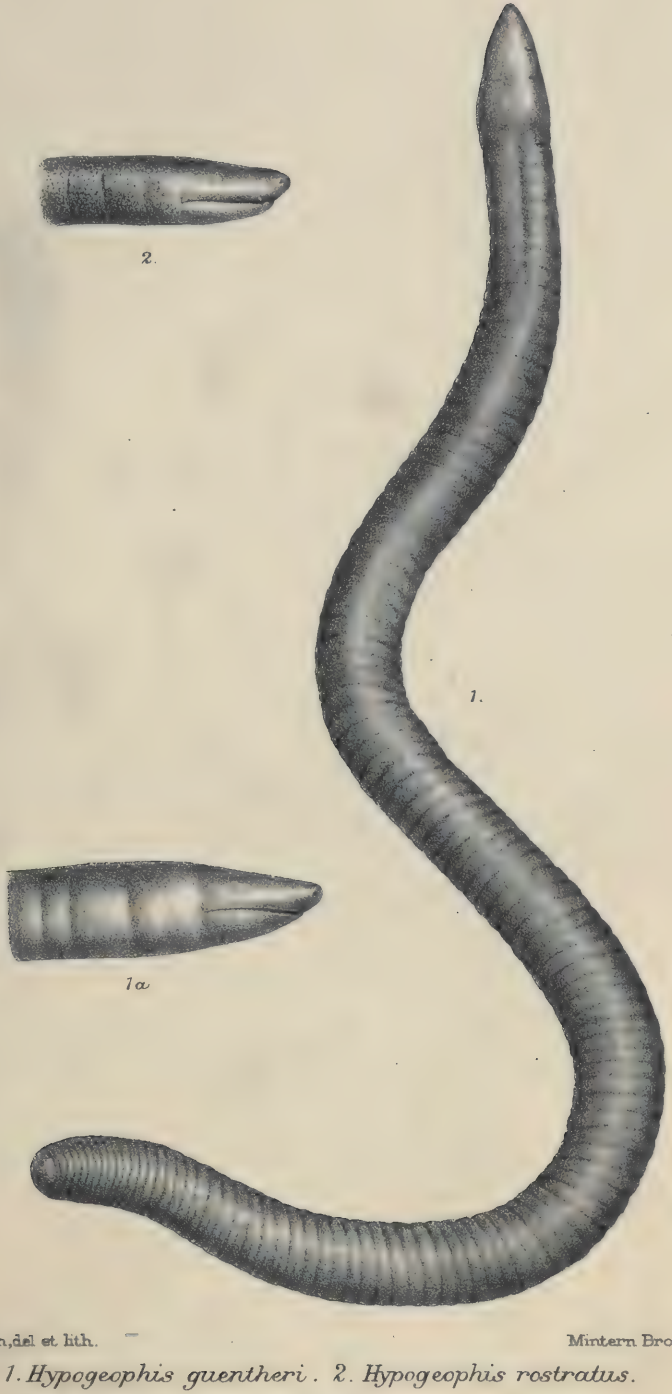


1 b.

J. Mintern, del. et lith.

Mintern Bros. imp

1. Cœcilia isthmica 2 Cœcilia pachynema



R. Mintern, del et lith.

Mintern Bros. imp.

1. Hypogeophis guentheri. 2. Hypogeophis rostratus.

R. Mintern, del. et lith.

Mintern Bros. imp.

1. Dermophis albiceps. 2. Dermophis mexicanus.
3. Gegeneophis carnosus 4. Siphonops annulatus.

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